

RADIO TEST REPORT

Product : HD Wireless Transmitter & Receiver Kit

Model Name : WTR-5600C

FCC ID : BY4WTR5600C

Test Regulation : FCC 47 CFR Part 15 Subpart C (Section 15.247)

Received Date : 2024/7/3

Test Date : 2024/7/4 ~ 2024/7/10

Issued Date : 2024/10/1

Applicant : Trans Electric Co., Ltd
771 Sec.2 Chungshan Rd, Huatang, Changhua, Taiwan 503

Issued By : Underwriters Laboratories Taiwan Co., Ltd.
Building A, B and E, No. 372-7, Sec. 4, Zhongxing Rd.,
Zhudong Township, Hsinchu County, Taiwan



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Doc No: Form-ULID-004737 (DCS:17-EM-F0876) / 6.1

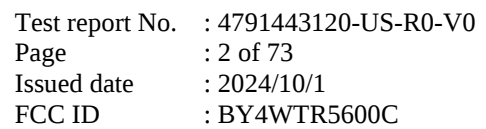


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1. Attestation of Test Results

APPLICANT: Trans Electric Co., Ltd
771 Sec.2 Chungshan Rd, Huatang, Changhua, Taiwan 503

MANUFACTURER: Trans Electric Co., Ltd
771 Sec.2 Chungshan Rd, Huatang, Changhua, Taiwan 503

EUT DESCRIPTION: HD Wireless Transmitter & Receiver Kit

BRAND: PX

MODEL: WTR-5600C

SAMPLE STAGE: Engineering Verification Test Sample

DATE of TESTED: 2024/7/4 ~ 2024/7/10

APPLICABLE STANDARDS	
STANDARD	Test Results
FCC 47 CFR PART 15 Subpart C (Section 15.247)	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:



Sally Lu
Project Handler

Date : 2024/10/1

Approved and Authorized By:



Eric Lee
Senior Laboratory Engineer

Date : 2024/10/1

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2. Summary of Test Results

Summary of Test Results		
FCC Clause	Test Items	Result
15.247(a)(2)	6dB Bandwidth	PASS
15.247(b)	Conducted Output Power	PASS
15.247(e)	Power Spectral Density	PASS
15.247(d)	Antenna Port Emission	PASS
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS
15.207	AC Power Conducted Emission	PASS
15.203	Antenna Requirement	PASS

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3. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with 47 CFR FCC Part 2, KDB558074 D01 Meas Guidance v05r02, KDB414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013.

4. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building A, B and E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398.

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5. Measurement Uncertainty

For statement of conformity, Simple acceptance (Section 3.1.4 of IEC Guide 115) was applied as decision rule for measurement in this test report.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k=2$.

Determining compliance based on the results of the compliance measurement, not considering measurement instrumentation uncertainty.

Measurement	Frequency	Uncertainty
Conducted disturbance at mains terminals ports	150kHz ~ 30MHz	3.1 dB
RF Conducted	9 kHz - 40GHz	2.3 dB
Radiated disturbance below 30MHz	9 kHz - 30 MHz	3.2 dB
Radiated disturbance below 1 GHz	30MHz ~ 1GHz	6.1 dB
Radiated disturbance above 1 GHz	1GHz ~ 40GHz	5.1 dB

6. Equipment under Test

6.1. Description of EUT

Product	HD Wireless Transmitter & Receiver Kit
Brand Name	PX
Model Name	WTR-5600C
Normal Voltage	DC 5V from USB

Operating Frequency	2412MHz ~ 2462MHz
Modulation	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to MCS7
Maximum Output Power	802.11b: 24.2 dBm 802.11g: 27.78 dBm 802.11n (HT20): 27.75 dBm 802.11n (HT40): 27.24 dBm
Sample ID	Conducted Test: 7372370 Radiated Test: 7372371

Note:

1. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

Modulation Mode	Tx,Rx Function
802.11b	1TX,1RX
802.11g	1TX,1RX
802.11n (HT20)	1TX,1RX
802.11n (HT40)	1TX,1RX

2. The EUT contains following accessory devices:

Product	Brand	Model	Description
USB-A to type C	PX	F1546-02G	-
Adaptor	AMIGO	AMS195-0502000FU	-
Type powering	PX	B1230G	-
HDMI powering	PX	B1231G	-

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual, the laboratory shall not be held responsible.

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6.2. Channel List

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	-	-

7 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	7	2442
4	2427	8	2447
5	2432	9	2452
6	2437	-	-

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6.3. Test Condition

Test Item	Test Site No.	Environmental Condition	Input Power	Test Date	Tested by
Antenna Port Conducted Measurement	SR4	22°C/ 69%RH	5Vdc	2024/07/10	WaterNil Guan
Radiated Spurious Emission	966-2	22~26°C/ 62~68%RH	5Vdc	2024/07/04~ 2024/07/09	WaterNil Guan
AC power Line Conducted Emission	SR1	23°C/ 67%RH	110Vac/ 60Hz	2024/07/09	WaterNil Guan

FCC Test Firm Registration Number: 498077

IC Company Number: 23421

Sample Calculation:

Antenna Port Conducted Measurement:

- Where relevant, the follow sample calculation is provided:
Result Value (dBm) = Reading Value (dBm) + Attenuator Factor (dB) + Cable Loss (dB).
Example: Result Value (10dBm) = Reading Value (-2dBm) + Attenuator Factor (10dB) + Cable Loss(2dB).
*Test plot only shown the “Result Value”.

Radiated Spurious Emission:

- Where relevant, the follow sample calculation is provided:
Result Value (dBuV/m) = Reading Value (dBuV) + Correction Factor (dB/m).
Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
Example: Result Value (34.5dBuV/m) = Reading Value (40.1dBuV) + Antenna Factor (18.7dB/m) + Cable Loss (4.2dB) - Preamp Factor (28.5dB).

AC power Line Conducted Emission:

- Where relevant, the follow sample calculation is provided:
Result Value (dBuV) = Reading Value (dBuV) + Correction Factor (dB).
Correction Factor (dB) = Insertion loss(dB) + Cable loss(dB).
Example: Result Value (53.7dBuV) = Reading Value (35.1dBuV) + Insertion loss(18.1dB) + Cable loss(0.5dB).

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6.4. Description of Available Antennas

Ant. No.	Transmitter Circuit	Brand Name	Model Name	Ant. Type	Frequency Band (MHz)	Maximum Gain (dBi)
TX	Chain 0	RedbirdTek	ANT000074	PIFA	2400~2500	3.04
					5150~5350	2.22
					5700~5850	2.12

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual, the laboratory shall not be held responsible.

6.5. Test Mode Applicability and Tested Channel Detail

- The fundamental of the EUT was investigated in three orthogonal axes X-Y/Y-Z/X-Z, it was determined that X-Y plane was worst-case. Therefore, all final radiated testing was performed with the EUT in X-Y plane.
- For Antenna Port Conducted Measurement, this item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.
- For below 1 GHz radiated emission and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Test Item	Mode	Modulation Technology	Modulation Type	Available Channel	Test Channel	Data Rate
Radiated Bandedge	802.11b	DSSS	DBPSK	1 to 11	1,6,11	1 Mbps
	802.11g	OFDM	BPSK	1 to 11	1,6,11	6 Mbps
	802.11n20	OFDM	BPSK	1 to 11	1,6,11	MCS0
	802.11n40	OFDM	BPSK	3 to 9	3,6,9	MCS0
Radiated Emissions (Above 1GHz)	802.11b	DSSS	DBPSK	1 to 11	1,6,11	1 Mbps
	802.11g	OFDM	BPSK	1 to 11	1,6,11	6 Mbps
Radiated Emissions (Below 1GHz)	802.11b	DSSS	DBPSK	1 to 11	11	1 Mbps
AC Power Line Conducted Emission	802.11g	OFDM	BPSK	1 to 11	6	6 Mbps
Antenna Port Conducted Measurement	802.11b	DSSS	DBPSK	1 to 11	1,6,11	1 Mbps
	802.11g	OFDM	BPSK	1 to 11	1,6,11	6 Mbps
	802.11n20	OFDM	BPSK	1 to 11	1,6,11	MCS0
	802.11n40	OFDM	BPSK	3 to 9	3,6,9	MCS0

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6.6. Duty cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle	Duty Factor (dB)	VBW Set (above 1GHz)
802.11b	8.470	8.870	0.9549	0.20	200Hz
802.11g	1.385	1.635	0.8471	0.72	1kHz
802.11n(HT20)	1.305	1.515	0.8614	0.65	1kHz
802.11n(HT40)	0.612	0.817	0.7491	1.25	2kHz



7. Test Equipment

Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Expired date
Radiated Spurious Emission					
Spectrum Analyzer	Keysight	N9010A	MY56070827	2024/3/29	2025/3/28
EMI Test Receiver	Rohde & Schwarz	ESR7	101754	2023/11/22	2024/11/21
Loop Antenna	ETS lindgren	6502	00213440	2023/12/13	2024/12/12
Trilog-Broadband Antenna with 5dB Attenuator	Schwarzbeck & EMCI	VULB 9168 & N-6-05	774 & AT-N0538	2024/1/5	2025/1/4
Horn Antenna (1-18 GHz)	Schwarzbeck	BBHA 9120 D	01690	2023/12/8	2024/12/7
Horn Antenna (18-40 GHz)	Schwarzbeck	BBHA 9170	781	2023/12/27	2024/12/26
Preamplifier (30-1000 MHz)	EMCI	EMC330E	980405	2024/5/28	2025/5/27
Preamplifier (1-18 GHz)	EMCI	EMC051835BE	980406	2024/1/23	2025/1/22
Preamplifier (18-40GHz)	EMCI	EMC184040SEE	980426	2024/4/16	2025/4/15
Cables (9k-18 GHz)	Hanyitek	K1K50-UP0264-K1K50-2500	170214-4 & 170425-2	2023/11/29	2024/11/28
Cables (18-40GHz)	Hanyitek	K1K50-UP0264-K1K50-2500	170214-1 & 170214-2	2023/11/29	2024/11/28

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Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Expired date
Antenna Port Conducted Measurement					
Signal Analyzer	Rohde & Schwarz	FSVA3044	101281	2024/3/18	2025/3/17
Signal Analyzer	Rohde & Schwarz	FSV40	101490	2023/9/13	2024/9/12
Attenuator	EMCI	EMC-40ATK2W10	17002	2023/11/15	2024/11/14
USB Power Sensor	Anritsu	MA24408A	12031	2024/7/13	2025/7/12
Temperature & Humidity Test Chamber	GIANT FORCE	GTH-150- 40-CP-AR	MAA1701-010	2024/3/6	2025/3/5
AC power Line Conducted Emission					
EMI Test Receiver	Rohde & Schwarz	ESR7	101753	2023/10/23	2024/10/22
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	2024/5/14	2025/5/13
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	2023/9/7	2024/9/6
Cables	TITAN	CFD200	T0732ACFD 20020A300-2	2024/5/14	2025/5/13

UL Software		
Description	Name	Version
Radiated measurement	e3	6.191211 (V6)
Conducted measurement	RF-Conducted-FCC 15247	ver 1.0
AC power Line Conducted Emission	EZ_EMG	UL-3A1.2

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8. Description of Test Setup

Tx Mode

Support Equipment

ID	裝置名稱	廠牌	型號	序號	Remark
A	Type powering	PX	B1230G	N/A	Supplied by Client
B	Laptop	Lenovo	T430	PB-8XTP2	Provide by Lab
C	USB OTG Plug Adapter	UGREEN	US157	N/A	Provide by Lab

I/O Cables

ID	裝置名稱	廠牌	型號	線長 (m)	Remark
1	USB RF Console Cable	PX	USB A to B 4 Pin	0.3	Supplied by Client
2	USB Standard Type A Male to Female Cable	I - wiz	US-44	1	Provide by Lab

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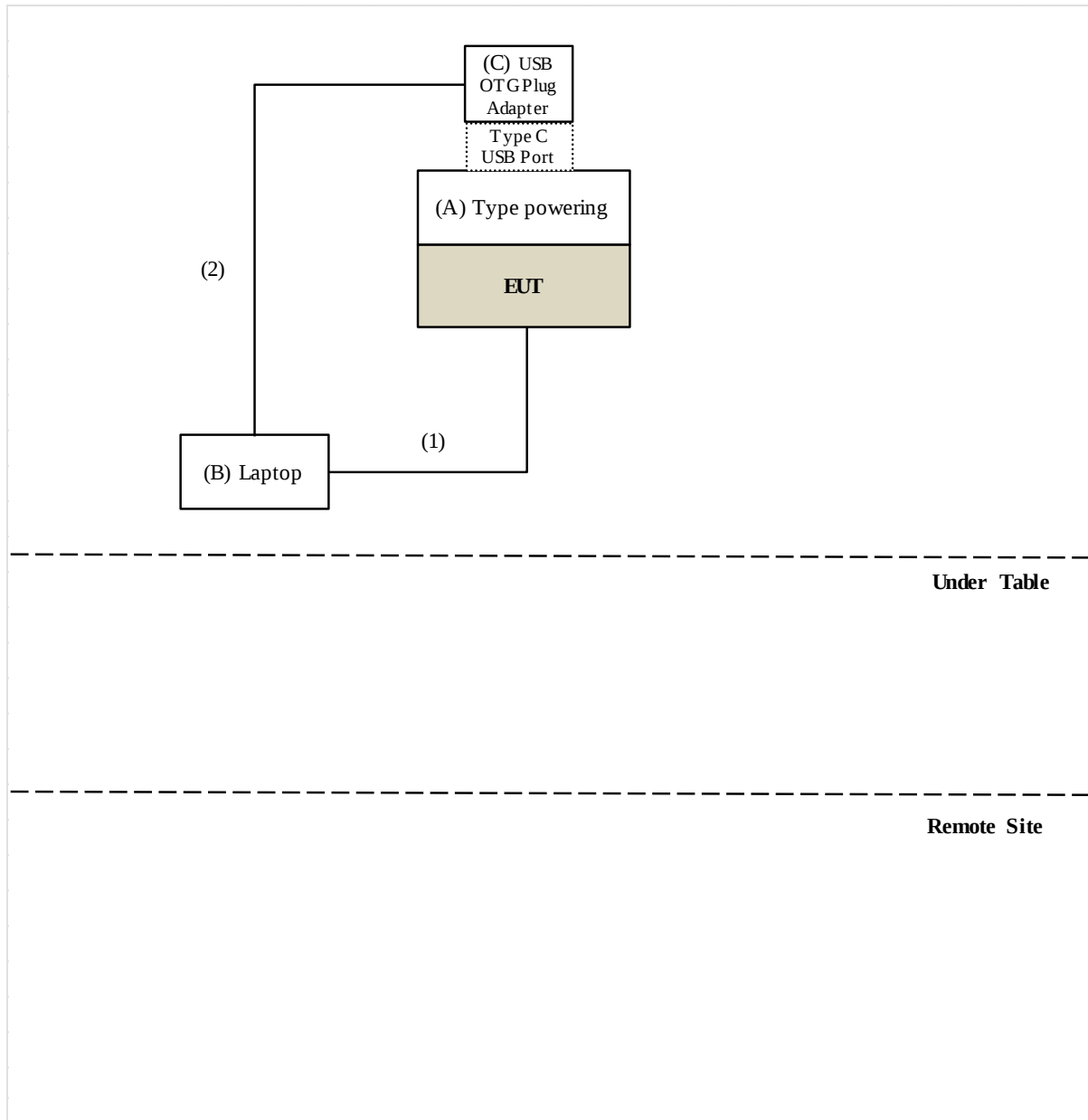
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Test Setup

Controlled using a bespoke application (RTL8723FU MP Version 0.0001.1020.2018) on a test Notebook. The application was used to enable a continuous transmission mode and to select the test channels, data rates, modulation schemes and power setting as required.

Setup Diagram for Test

Tx Mode



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9. Test Results

9.1. 6dB Bandwidth

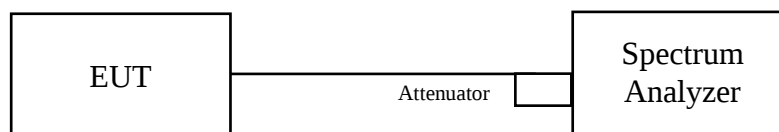
Requirements

The minimum 6 dB bandwidth shall be at least 500 kHz.

Test procedure

- Set resolution bandwidth (RBW) = 100kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

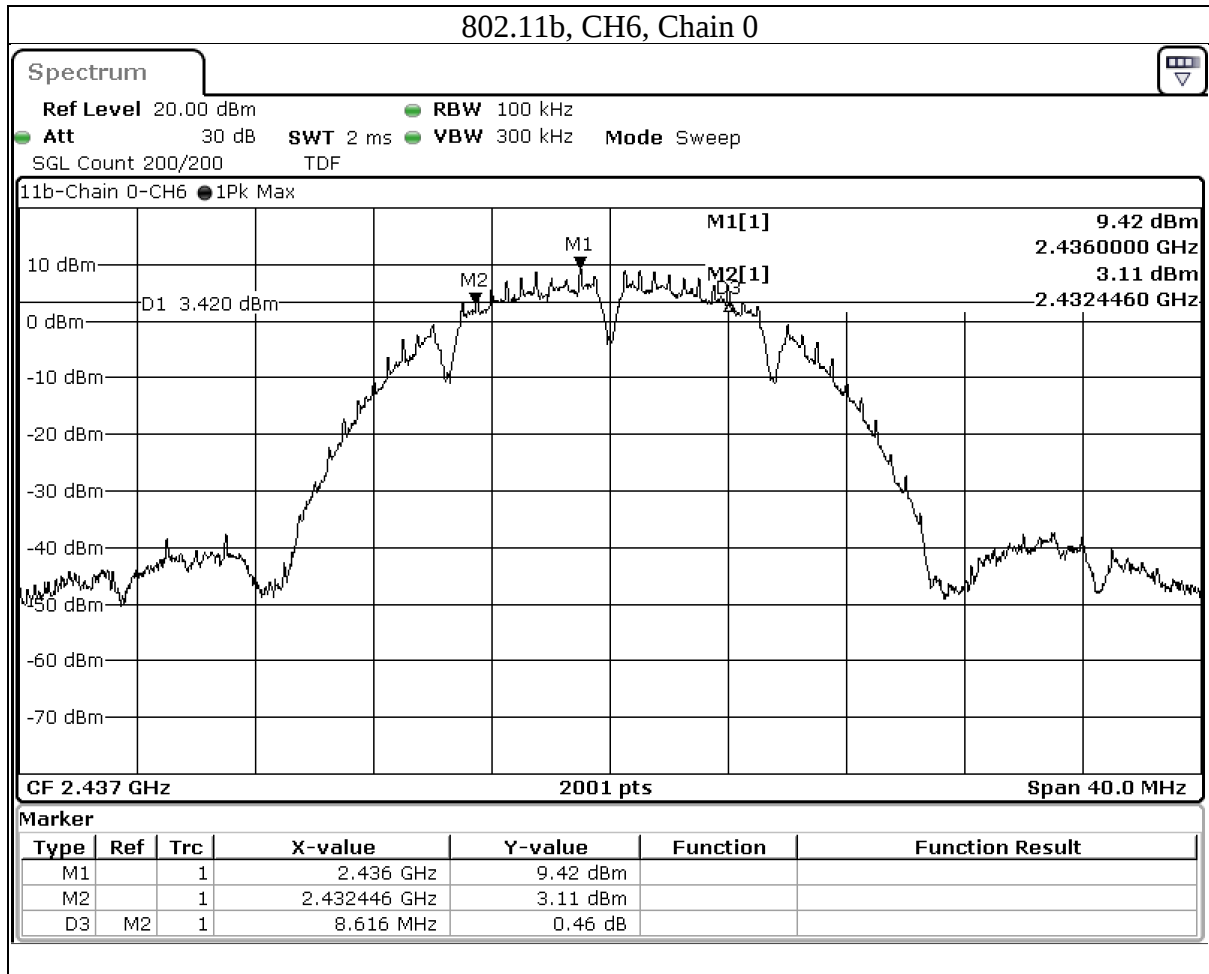
Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

Test Data

Mode	CH	Freq (MHz)	6dB BW (MHz)	Limit (MHz)	Result
			Chain 0		
802.11b	1	2412	9.540	0.5	PASS
	6	2437	8.616	0.5	PASS
	11	2462	9.586	0.5	PASS



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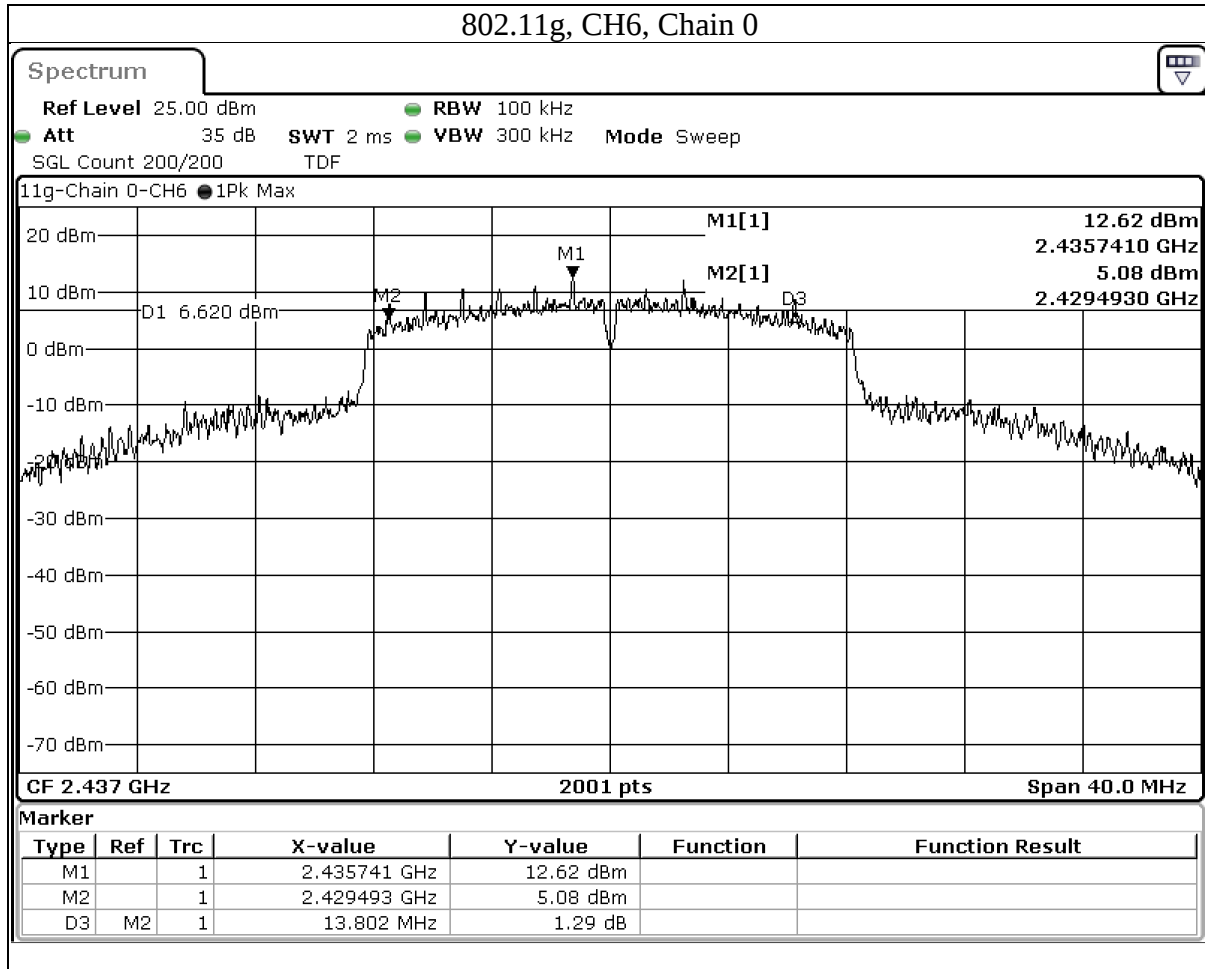
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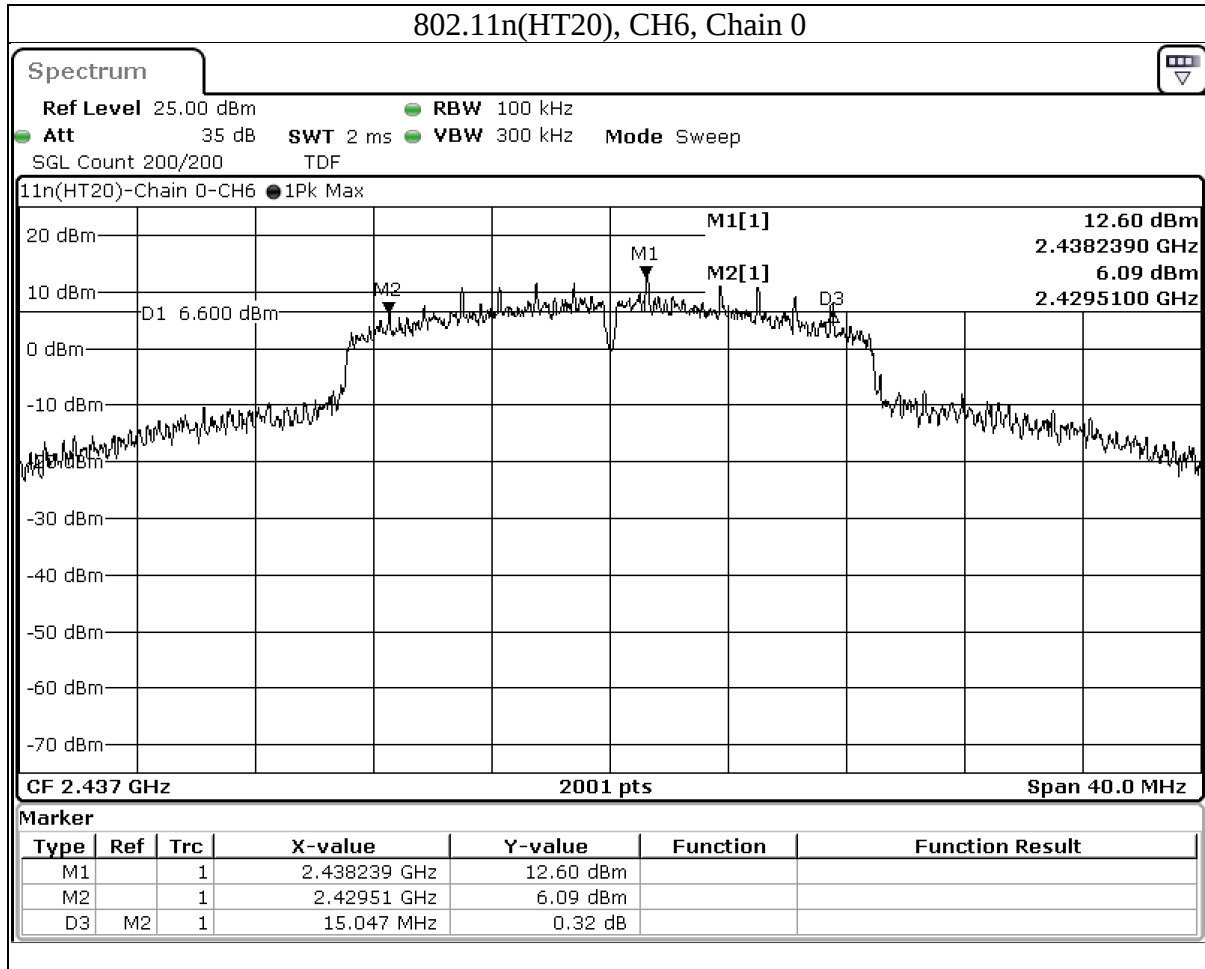
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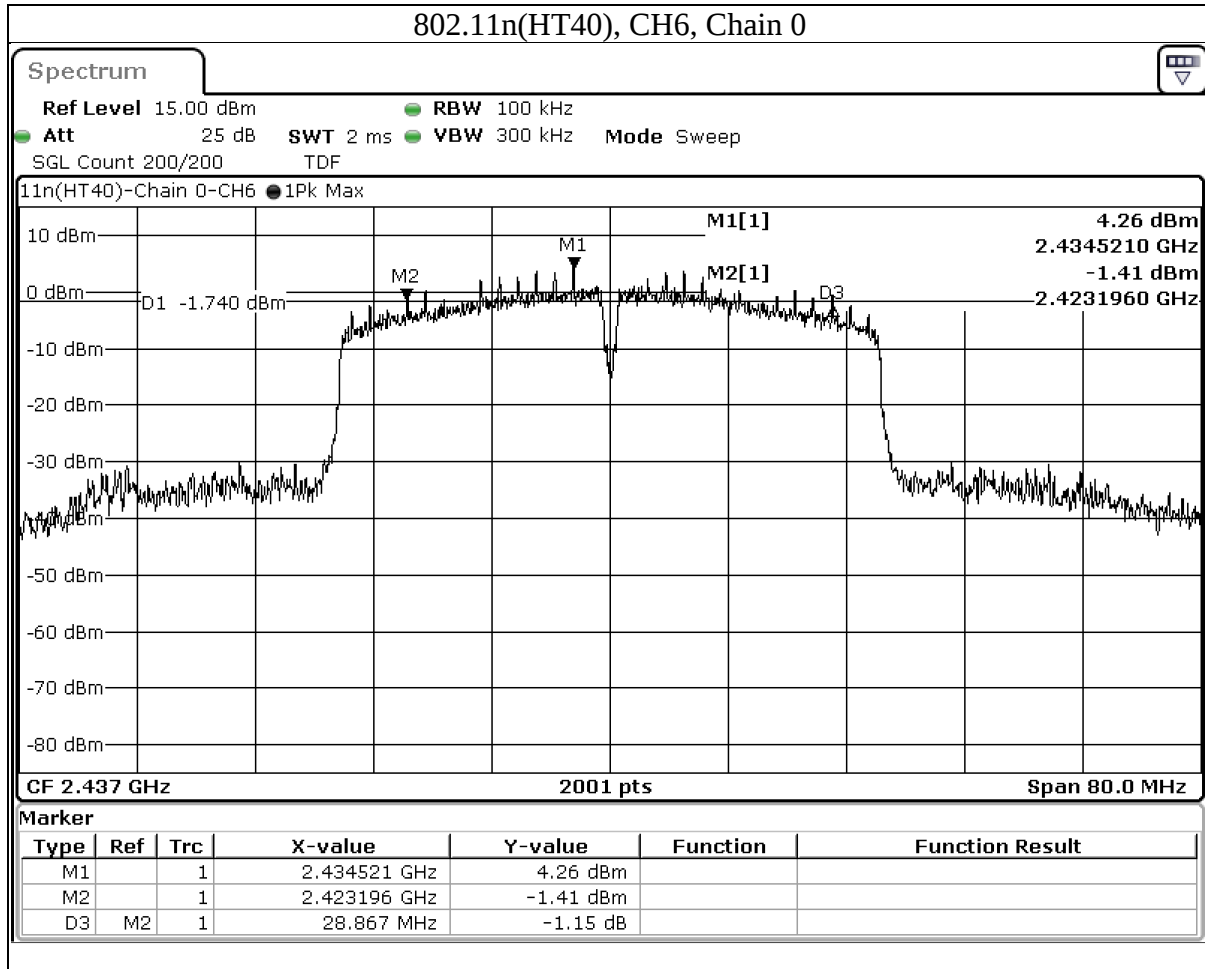
Mode	CH	Freq (MHz)	6dB BW (MHz)	Limit (MHz)	Result
			Chain 0		
802.11g	1	2412	15.104	0.5	PASS
	6	2437	13.802	0.5	PASS
	11	2462	13.862	0.5	PASS



Mode	CH	Freq (MHz)	6dB BW (MHz)	Limit (MHz)	Result
			Chain 0		
802.11n(HT20)	1	2412	15.052	0.5	PASS
	6	2437	15.047	0.5	PASS
	11	2462	15.081	0.5	PASS



Mode	CH	Freq (MHz)	6dB BW (MHz)	Limit (MHz)	Result
			Chain 0		
802.11n(HT40)	3	2422	31.339	0.5	PASS
	6	2437	28.867	0.5	PASS
	9	2452	31.353	0.5	PASS



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9.2. Conducted Output Power

Requirements

For systems using digital modulation in the 2400-2483.5 MHz bands: 1 Watt.

Note:

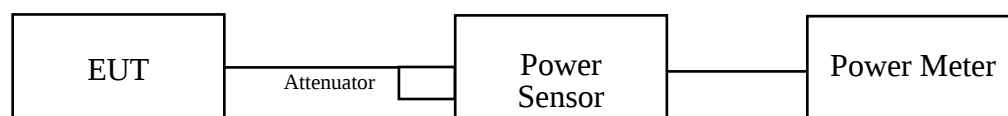
1. P_{Out} = maximum conducted output power in dBm, G_{TX} = the maximum transmitting antenna directional gain in dBi, B is the 26 dB emission bandwidth in megahertz
2. If EUT with Multiple Transmitter Output:
 - a. Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{Gn/20})^2 / \text{Nant}]$ dBi.
Nant: Number of Transmit Antennas
G1, G2,..., Gn: Gain of Individual Antennas
Example: two antenna and gain 5 dBi / 3dBi, so if it was used for TxBF power measurement
Directional Gain = $10 \log[(105/20 + 103/20)^2 / 2]$ dBi = 7.07 dBi
 - b. Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices, CDD
Array Gain = 0 dB (i.e., no array gain) for $\text{NANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;
Array Gain = $5 \log(\text{NANT}/\text{NSS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $\text{NANT} \geq 5$.
Example: Maximum antenna gain = 5 dBi and $\text{NANT} \leq 4$, so if it was used for CDD power measurement
Directional Gain = 5 dBi + Array Gain = 5 dBi + 0 dB = 5 dBi
 - c. For power measurement of KDB 662911 is used with multiple transmitter output. Total conducted power is the sum of the conducted power levels measured at the various output ports.

Test Procedure

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

- a. Set the RBW $\geq$ DTS bandwidth.
- b. Set VBW $\geq 3 \times$ RBW.
- c. Set span $\geq 3 \times$ RBW.
- d. Sweep time = auto couple.
- e. Detector = peak.
- f. Trace mode = max hold.
- g. Allow trace to fully stabilize.
- h. Use peak marker function to determine the peak amplitude level.

Test Setup



The loss between RF output port of the EUT and the input port of the Power Meter has been taken into consideration.

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Test Data**Peak Power****802.11b**

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	130.017	21.14	30	PASS
6	2437	180.717	22.57	30	PASS
11	2462	263.027	24.20	30	PASS

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	427.563	26.31	30	PASS
6	2437	599.791	27.78	30	PASS
11	2462	490.908	26.91	30	PASS

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	426.58	26.30	30	PASS
6	2437	595.662	27.75	30	PASS
11	2462	469.894	26.72	30	PASS

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	406.443	26.09	30	PASS
6	2437	529.663	27.24	30	PASS
9	2452	412.098	26.15	30	PASS

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Average Power (Reference Only)**802.11b**

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	73.451	18.66
6	2437	103.039	20.13
11	2462	149.624	21.75

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	57.412	17.59
6	2437	242.103	23.84
11	2462	60.674	17.83

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	53.333	17.27
6	2437	235.505	23.72
11	2462	53.827	17.31

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	40.458	16.07
6	2437	74.302	18.71
9	2452	44.055	16.44

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9.3. Power Spectral Density

Requirements

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 kHz (If $G_{TX} > 6$ dBi, then $PSD = 8 - (G_{TX} - 6)$).

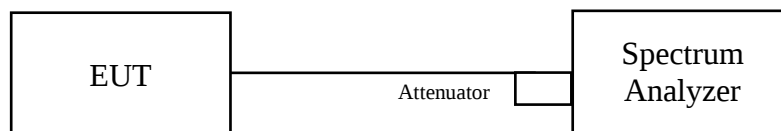
Note:

1. PSD = power spectral density that the same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz.
2. G_{TX} = the maximum transmitting antenna directional gain in dBi.
3. If EUT with Multiple Transmitter Output:
 - a. Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{Gn/20})^2 / Nant]$ dBi.
Nant: Number of Transmit Antennas
 $G1, G2, \dots, Gn$: Gain of Individual Antennas
Example: two antenna and gain 5 dBi / 3dBi, so if it was used for power density measurement
Directional Gain = $10 \log[(10^{5/20} + 10^{3/20})^2 / 2]$ dBi = 7.07 dBi
 - b. "PSD per chain" of the report shown is maximum value for each chain, at the "Total PSD" is summing entire spectra across corresponding frequency bins on the various outputs by computer, refer KDB 662911 Method a) for calculating total power density.
 - c. Method a) of power density measurement of KDB 662911 is used for calculating total power density with multiple transmitter output. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

Test procedure

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to: $3 \text{ kHz} \leq RBW \leq 100 \text{ kHz}$.
- d. Set the VBW $\geq 3 \times RBW$.
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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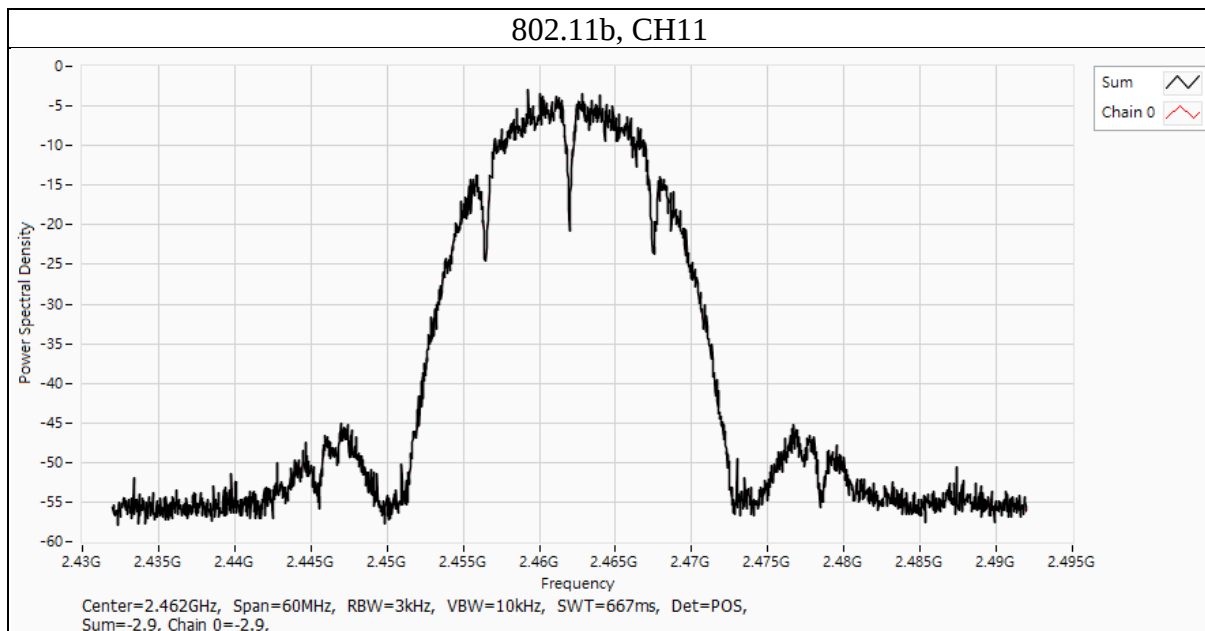
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Test Data

Mode	CH	Freq (MHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Directional Gain (dBi)	Result
802.11b	1	2412	-5.75	8	3.04	PASS
	6	2437	-4.19	8	3.04	PASS
	11	2462	-2.9	8	3.04	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz) Chain 0
802.11b	1	2412	-5.75
	6	2437	-4.19
	11	2462	-2.9



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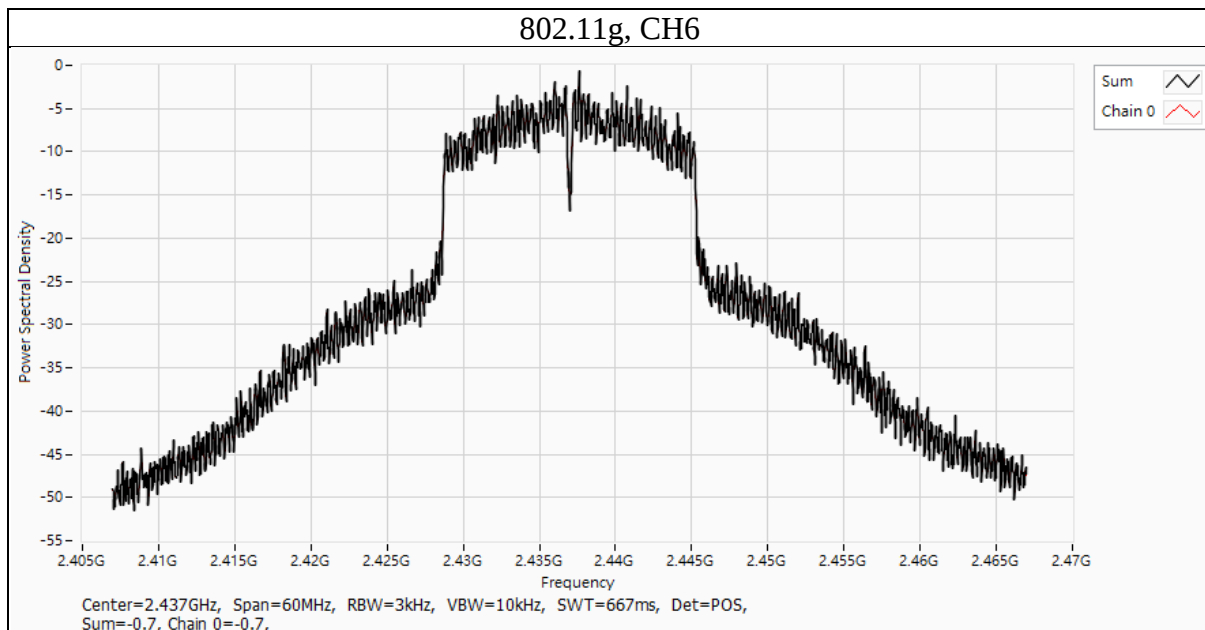
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Mode	CH	Freq (MHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Directional Gain (dBi)	Result
802.11g	1	2412	-9.19	8	3.04	PASS
	6	2437	-0.7	8	3.04	PASS
	11	2462	-8.26	8	3.04	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz) Chain 0
802.11g	1	2412	-9.19
	6	2437	-0.7
	11	2462	-8.26



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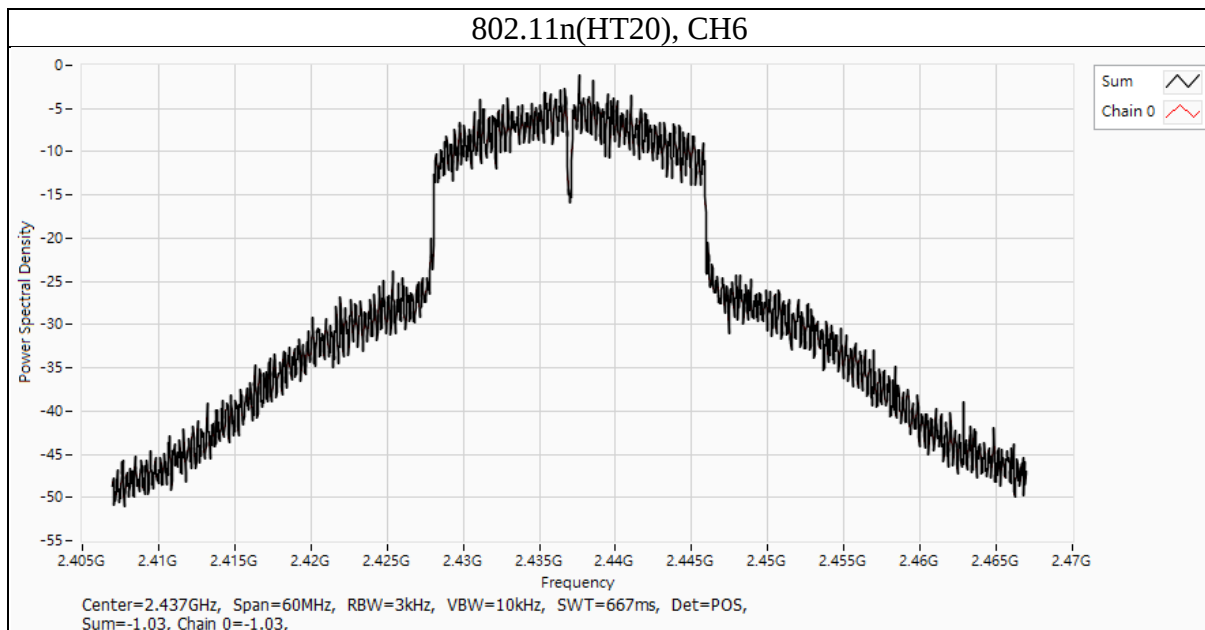
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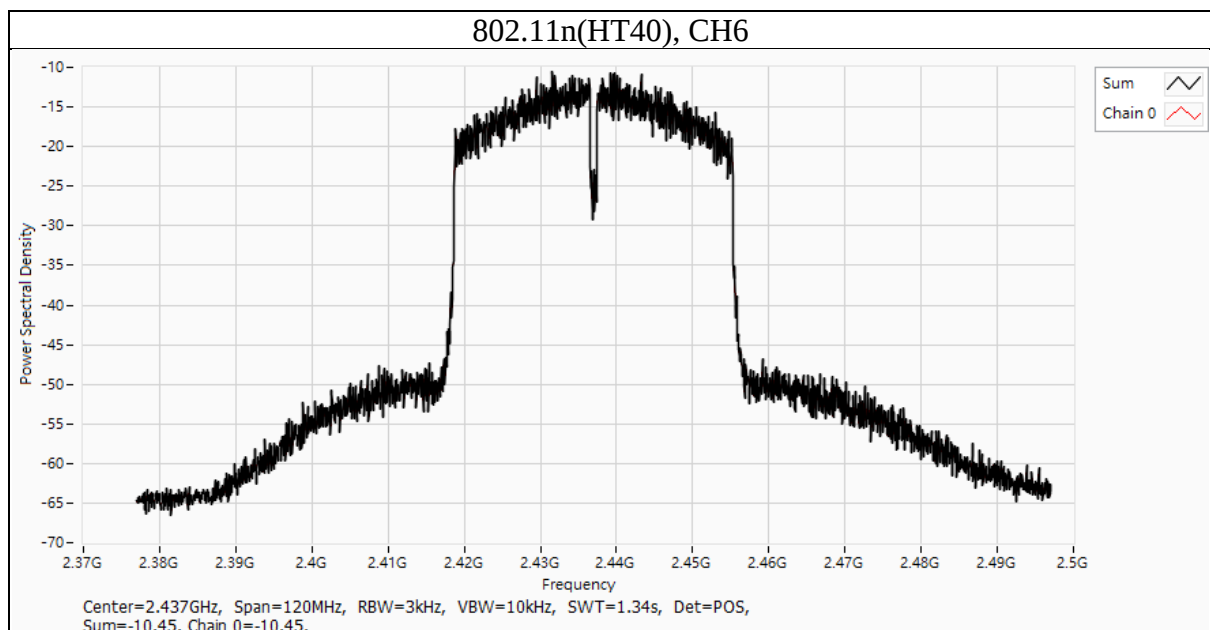
Mode	CH	Freq (MHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Directional Gain (dBi)	Result
802.11n(HT20)	1	2412	-6.08	8	3.04	PASS
	6	2437	-1.03	8	3.04	PASS
	11	2462	-7.92	8	3.04	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz) Chain 0
802.11n(HT20)	1	2412	-6.08
	6	2437	-1.03
	11	2462	-7.92



Mode	CH	Freq (MHz)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Directional Gain (dBi)	Result
802.11n(HT40)	3	2422	-12.72	8	3.04	PASS
	6	2437	-10.45	8	3.04	PASS
	9	2452	-11.61	8	3.04	PASS

Mode	CH	Freq (MHz)	PSD per Chain (dBm/3kHz) Chain 0
802.11n(HT40)	3	2422	-12.72
	6	2437	-10.45
	9	2452	-11.61



9.4. Conducted Out of Band Emission

Requirements

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b) (3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209 (a) is not required.

Test procedure

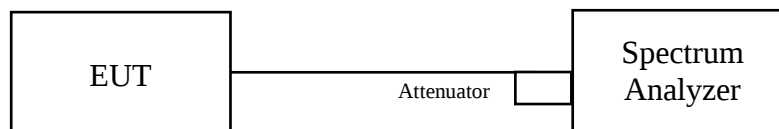
Measurement Procedure REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Set the span to 1.5 times the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

Measurement Procedure OOBE

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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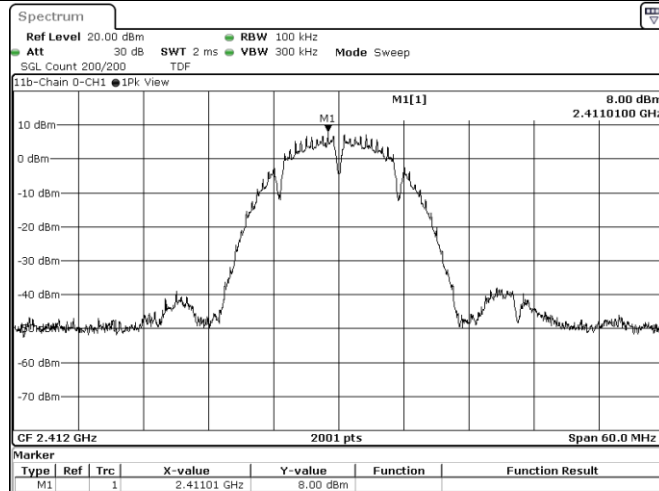
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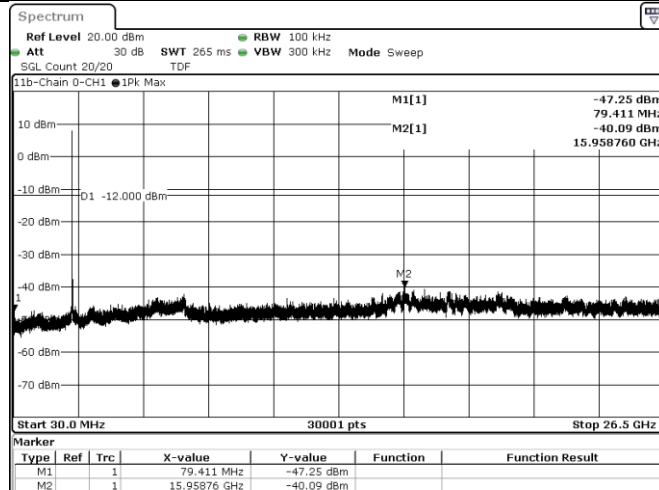
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Test Data

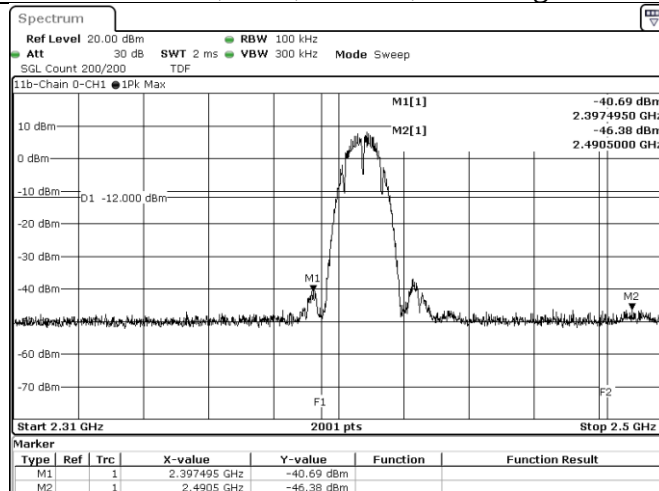
802.11b, CH1, Chain 0, Reference



802.11b, CH1, Chain 0, Conducted Emission



802.11b, CH1, Chain 0, Band edge



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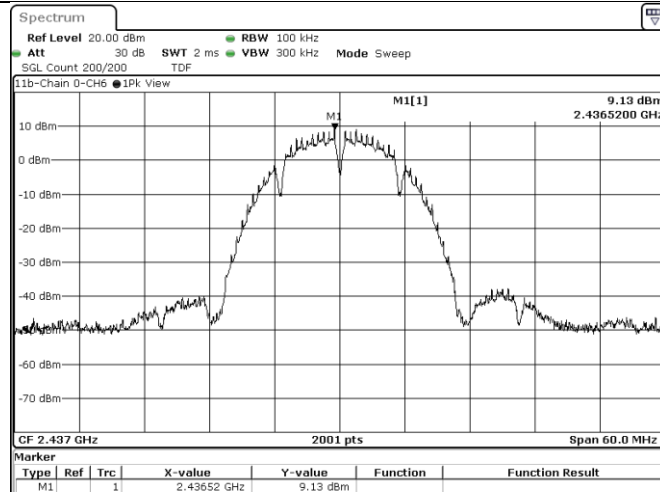
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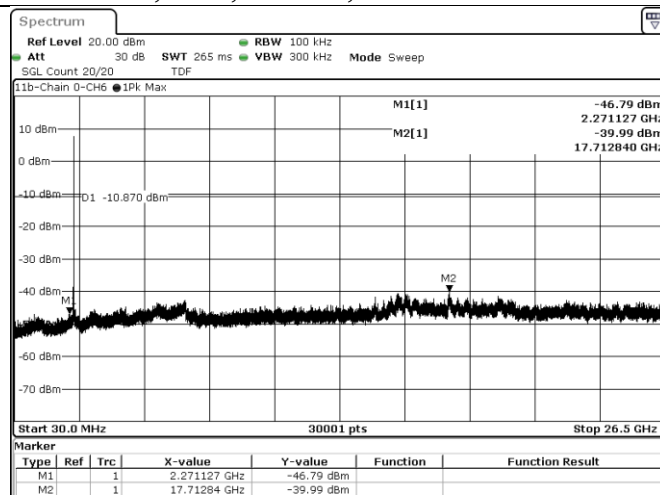
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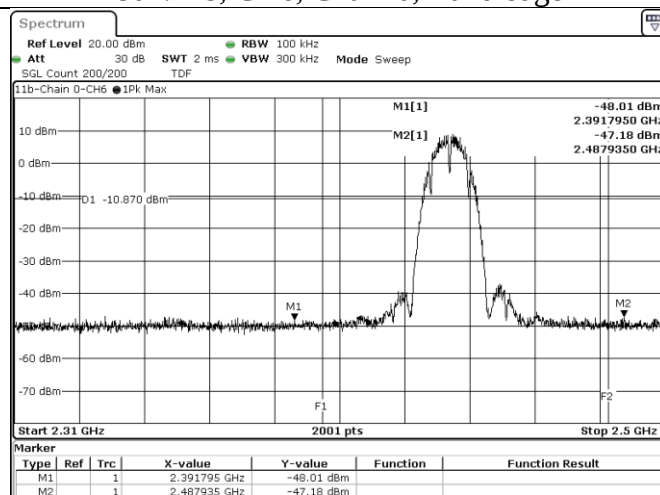
802.11b, CH6, Chain 0, Reference



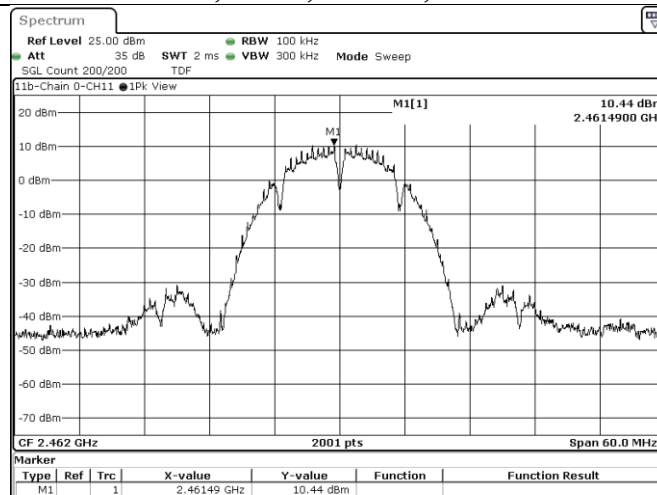
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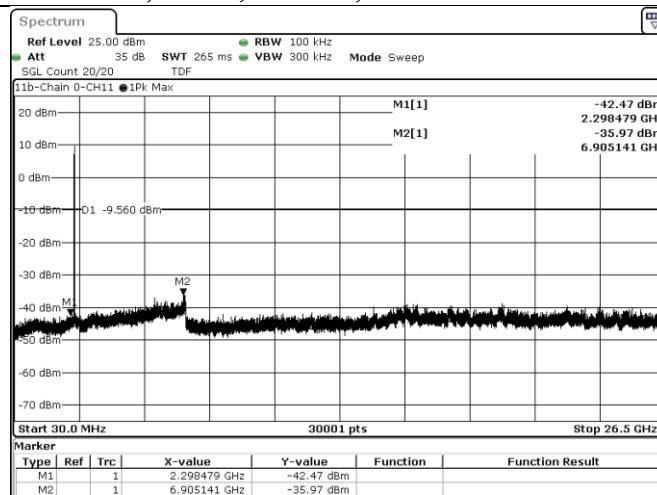
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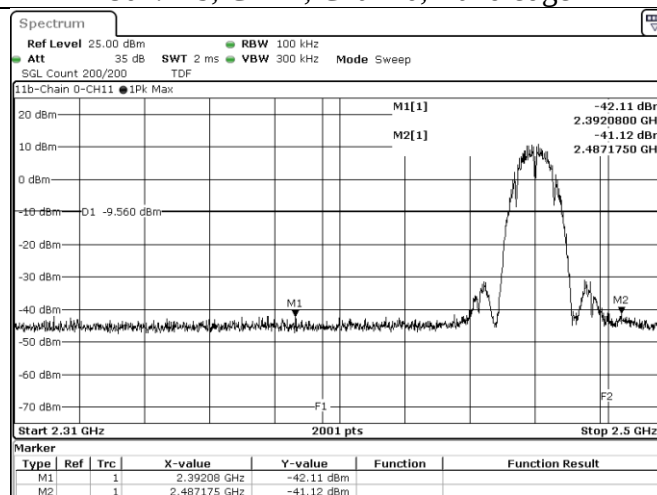
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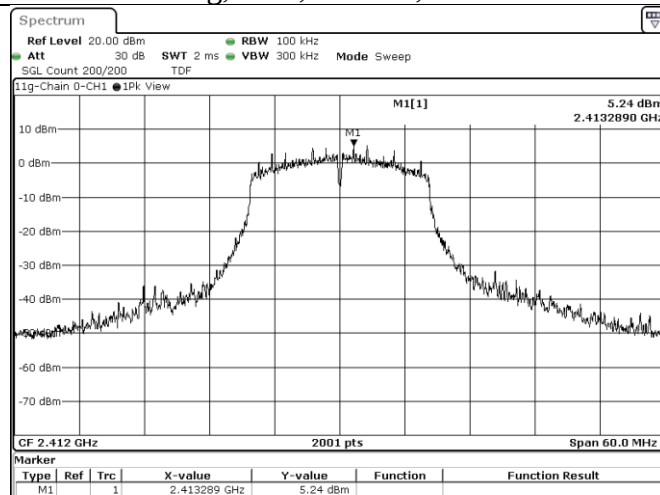
802.11b, CH11, Chain 0, Conducted Emission



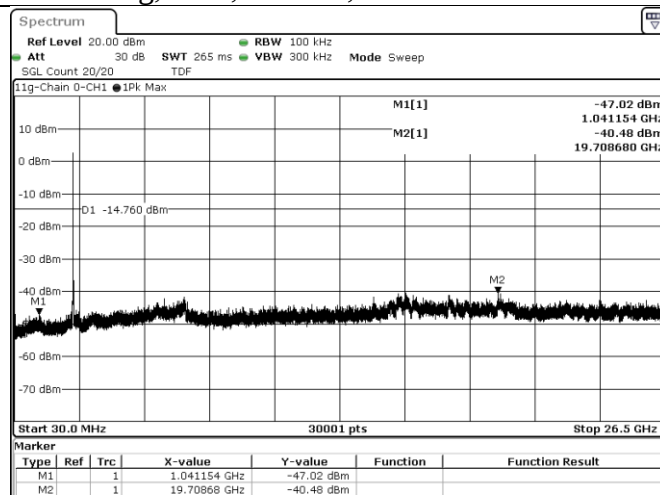
802.11b, CH11, Chain 0, Band edge



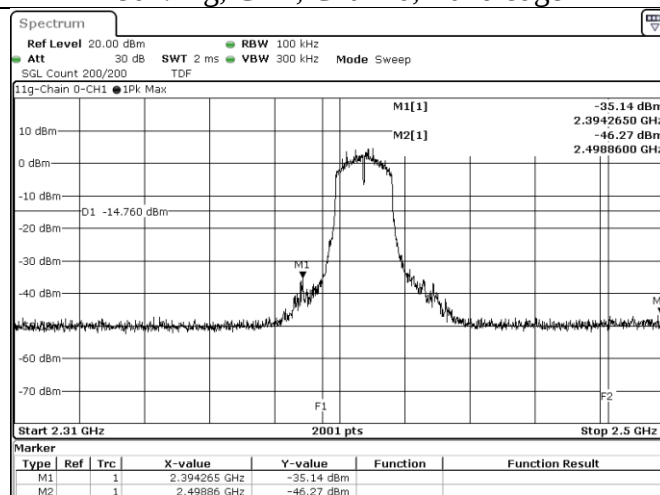
802.11g, CH1, Chain 0, Reference



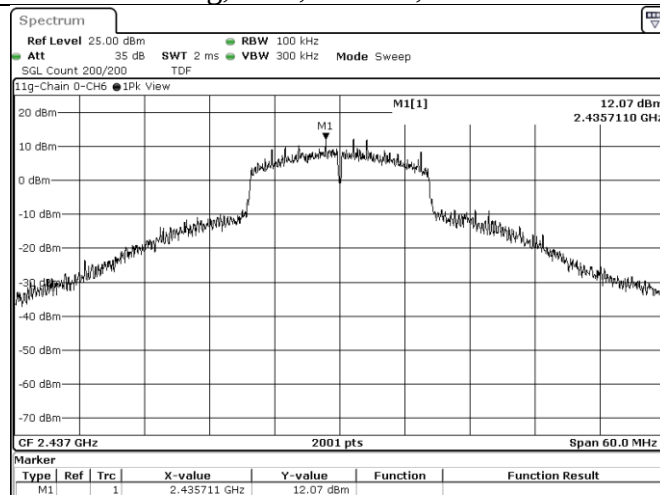
802.11g, CH1, Chain 0, Conducted Emission



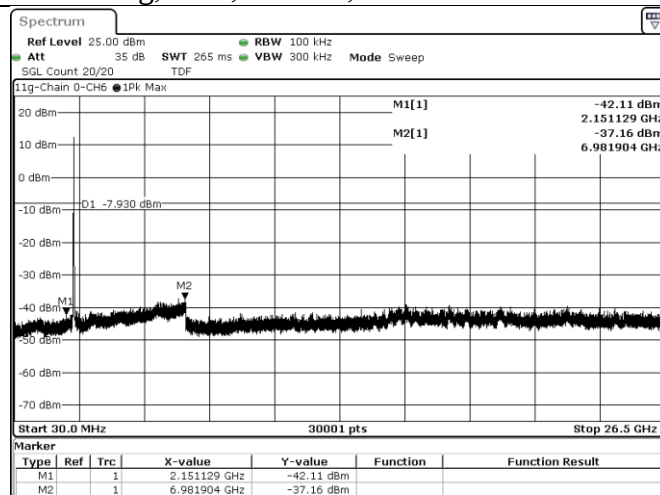
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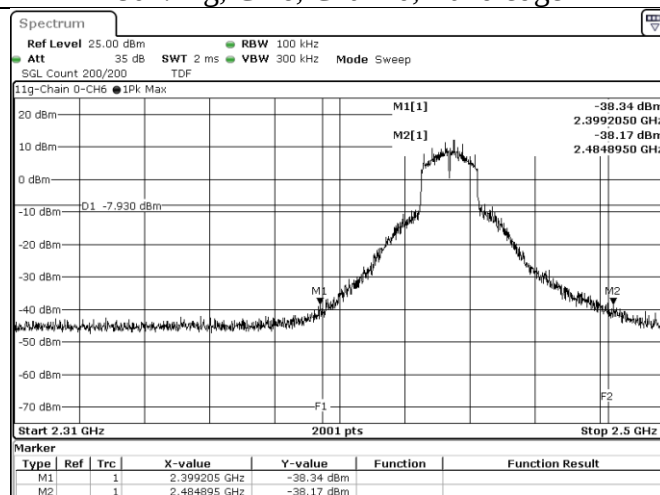
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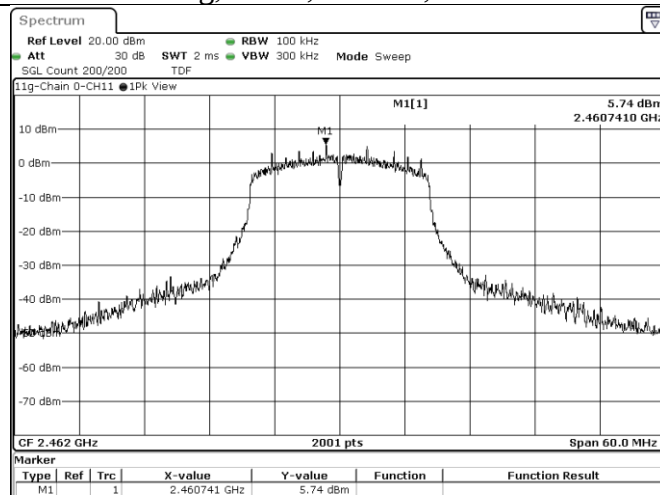
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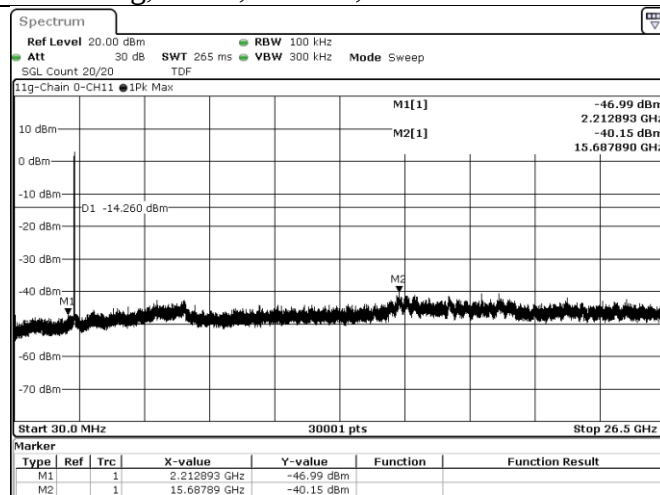
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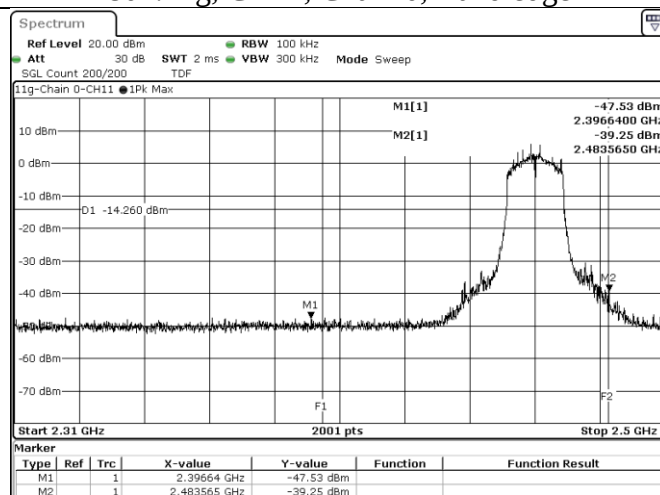
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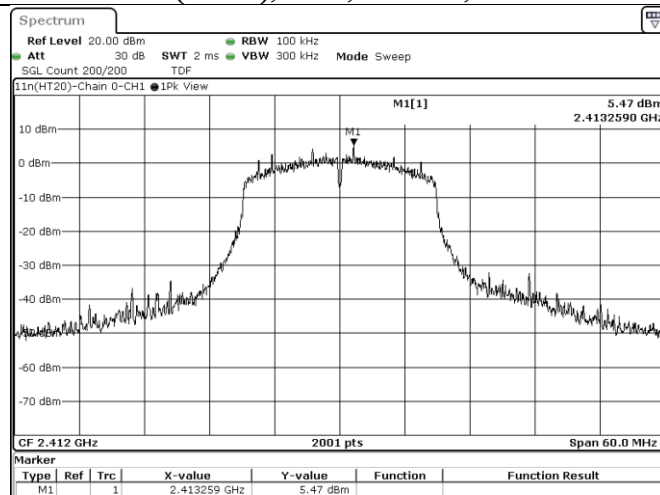
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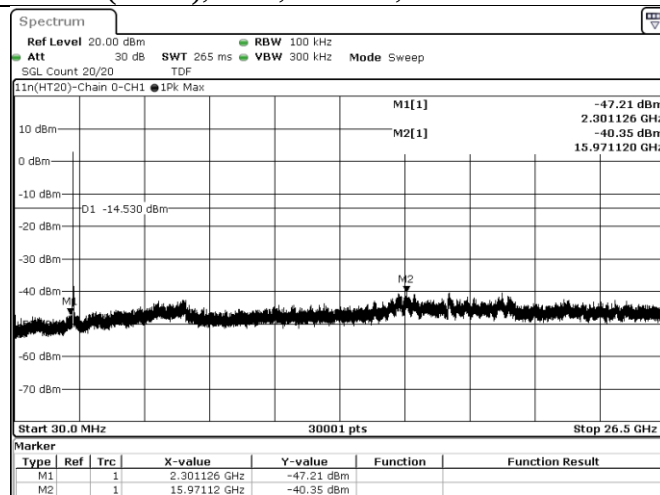
802.11g, CH11, Chain 0, Band edge



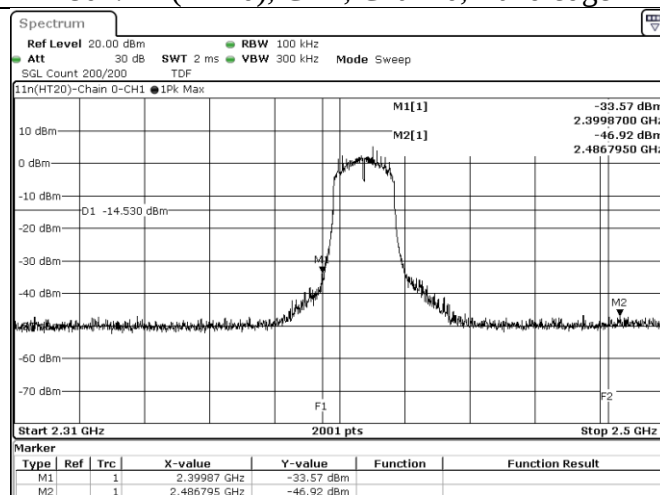
802.11n(HT20), CH1, Chain 0, Reference



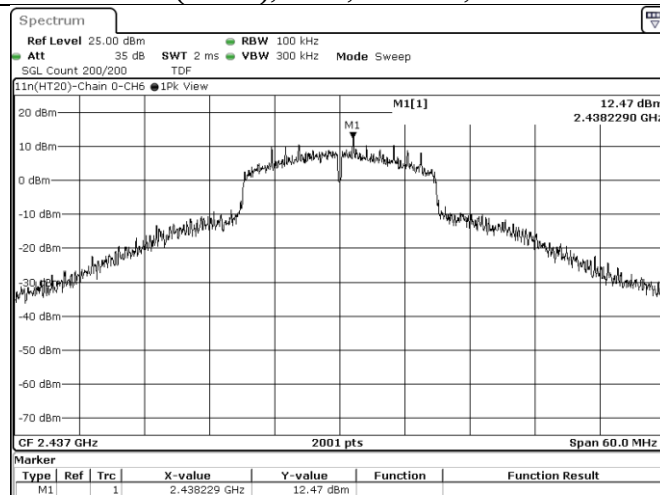
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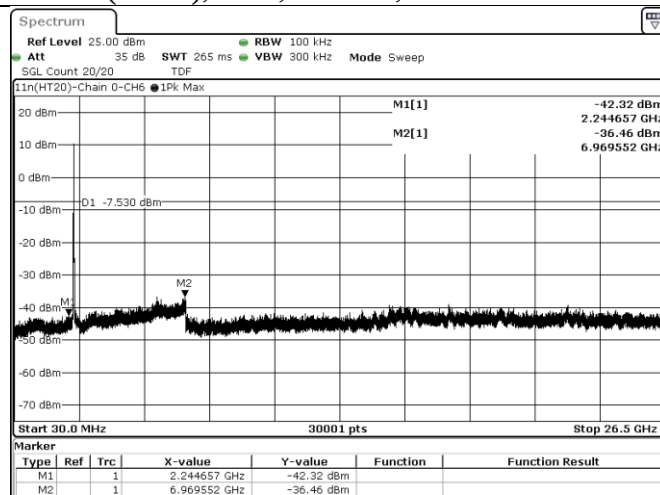
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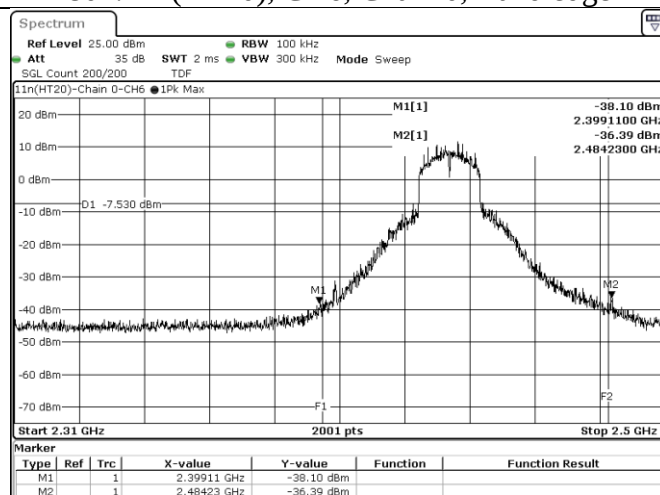
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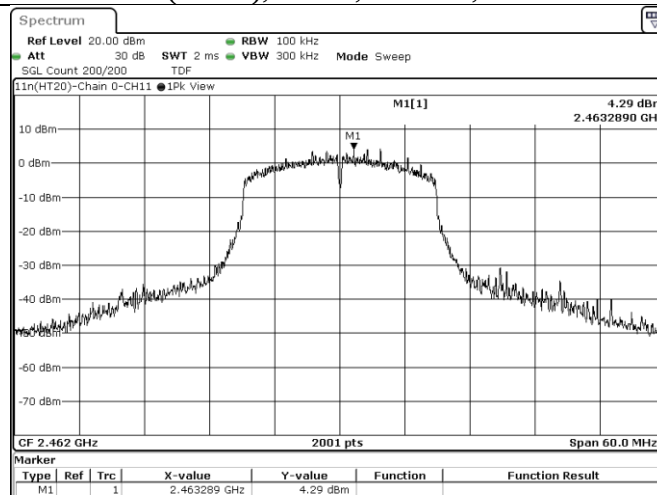
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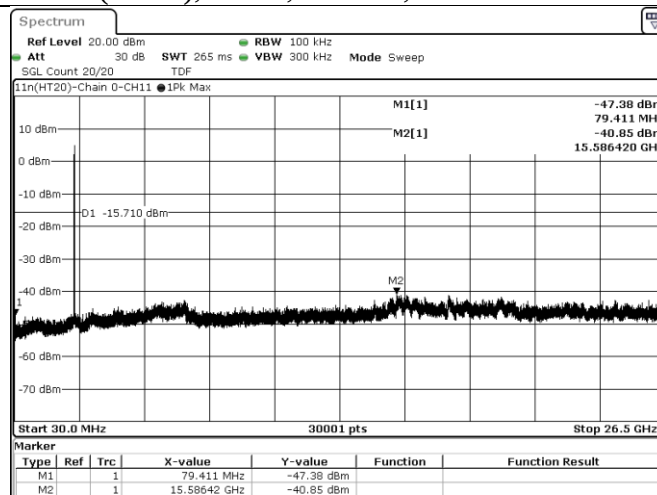
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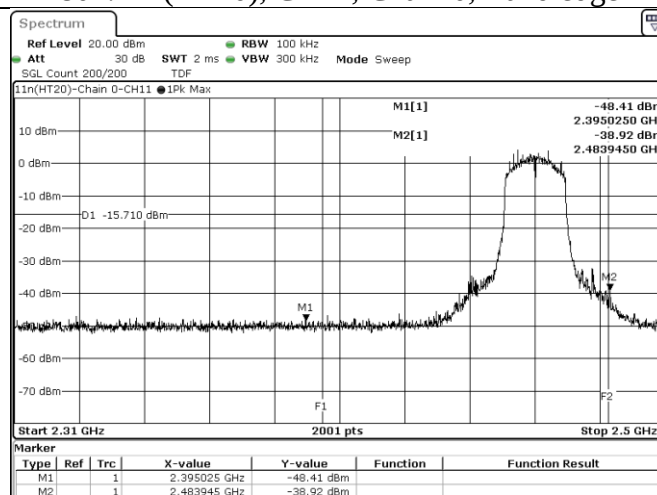
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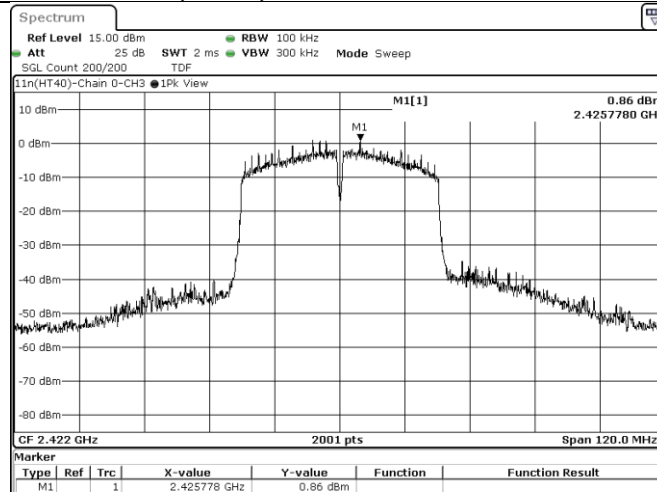
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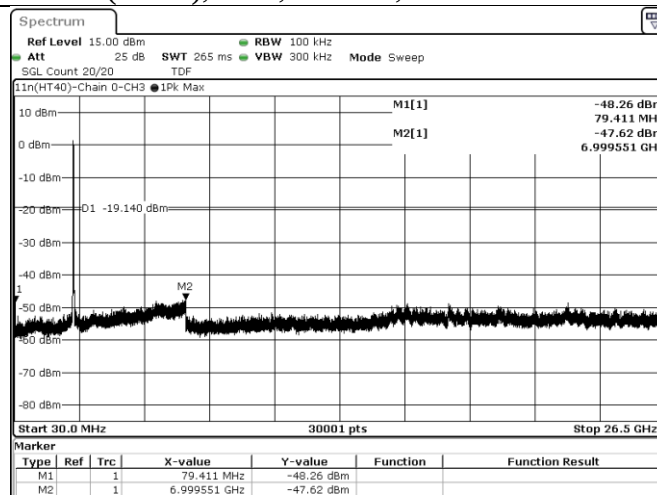
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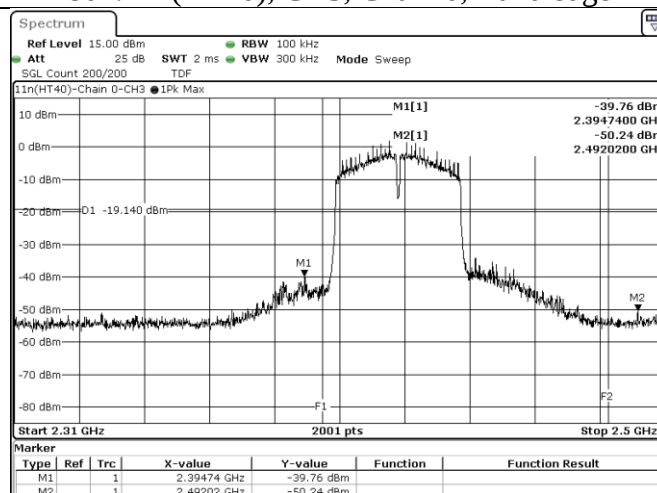
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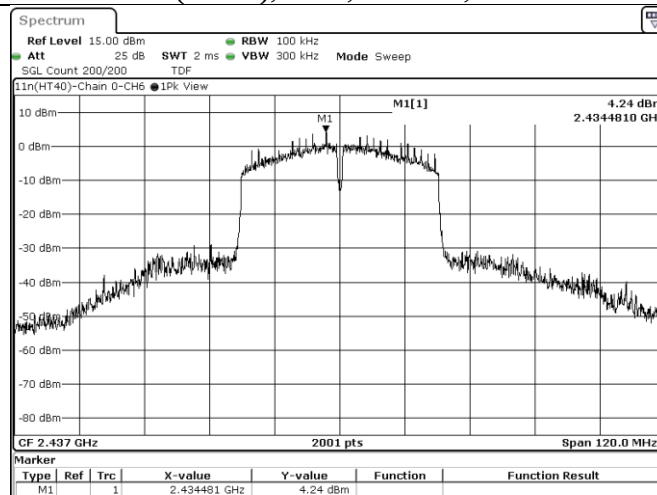
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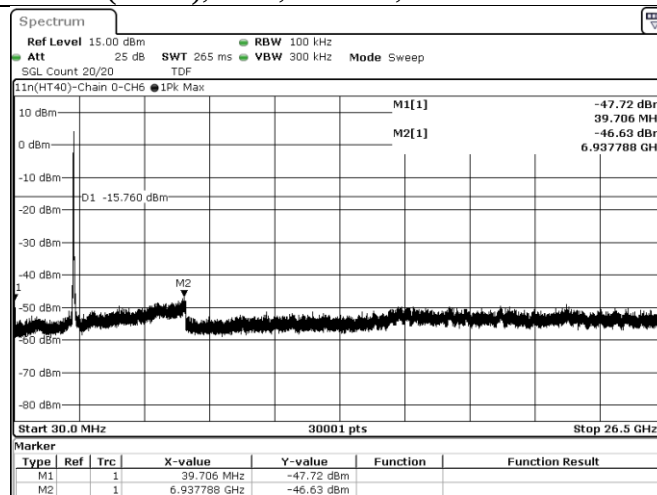
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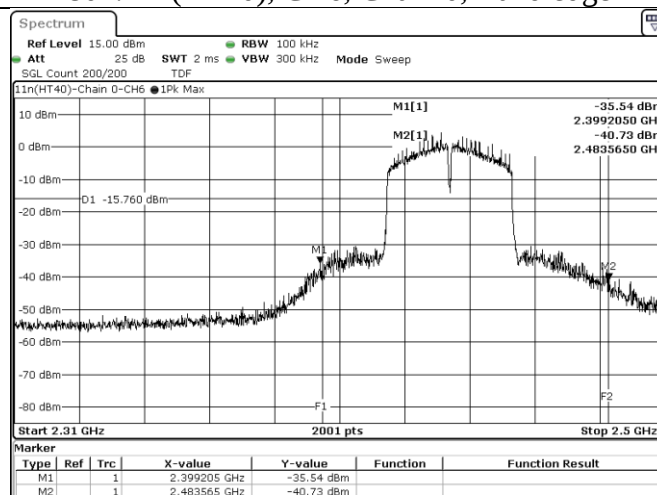
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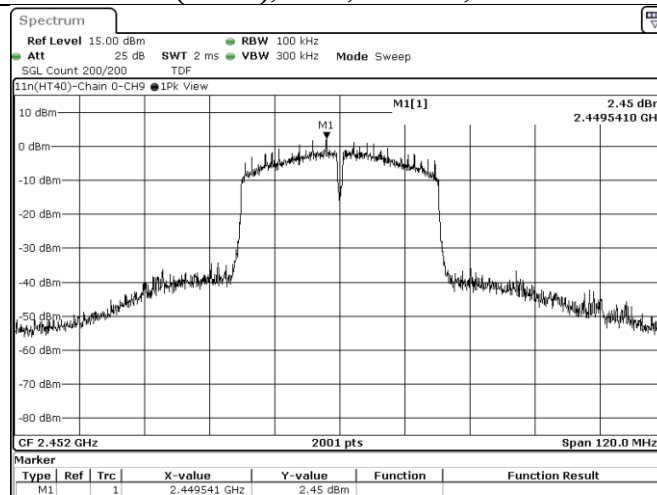
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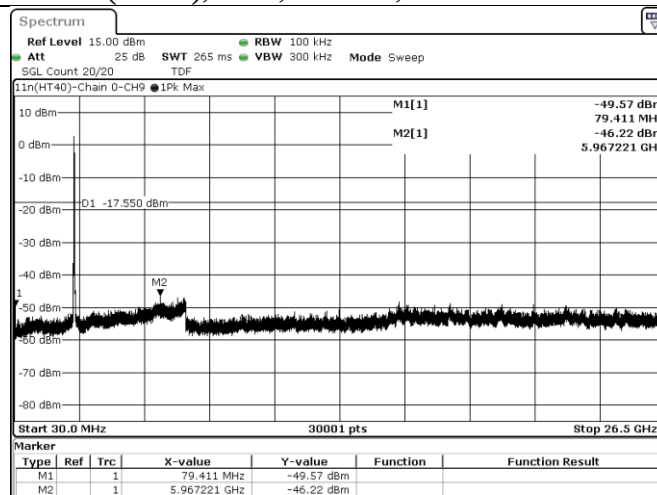
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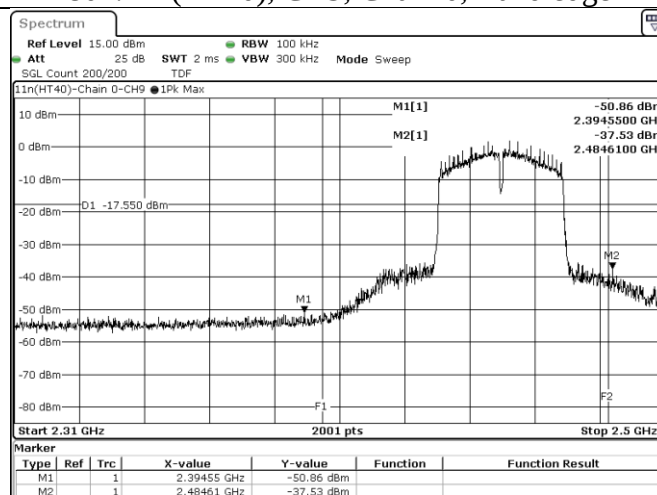
802.11n(HT40), CH9, Chain 0, Reference



802.11n(HT40), CH9, Chain 0, Conducted Emission



802.11n(HT40), CH9, Chain 0, Band edge



9.5. Radiated Spurious Emission

Requirements

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequency(MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

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Doc No: Form-ULID-004737 (DCS:17-EM-F0876) / 6.1

Test Procedures

[For 9 kHz ~ 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 30MHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

[For above 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

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Note:

- a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- b. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.

Peak

Frequency	RBW	VBW
9 kHz~150 kHz	200 Hz	600 Hz
150 kHz~30 MHz	10 kHz	30 kHz
30 MHz~1 GHz	120 kHz	360 kHz
Above 1GHz	1 MHz	3 MHz

Average for above 1GHz

RBW	VBW
1MHz	Refer to section 6.6 for duty cycle.

- d. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
- e. Test data of Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
- f. Test data of Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
- g. Test data of Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) - Preamp Factor (dB).
- h. Test data of Notation "@" = Fundamental Frequency
- i. Test data of Notation "*" = The peak result under 20 dB above and complies with AVG limit, AVG result is deemed to comply with AVG limit.

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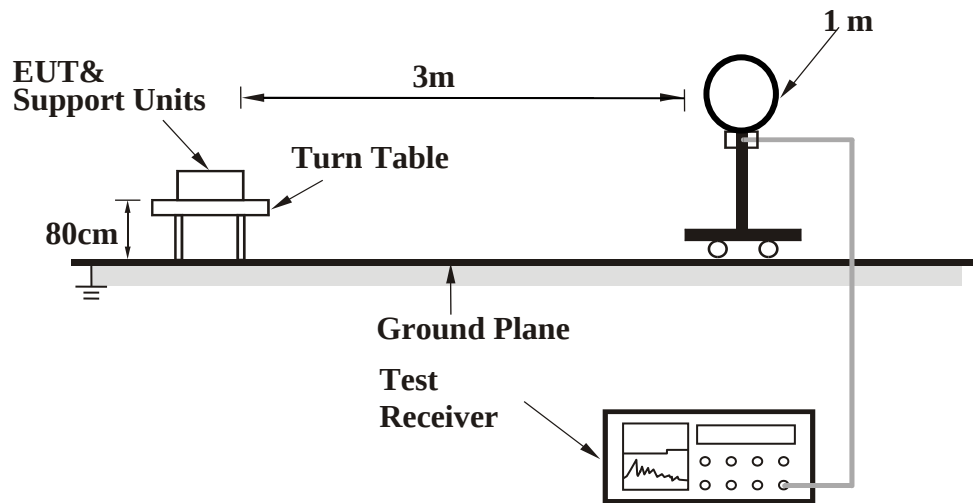
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Facsimile (FAX) : +886-3-583-7948

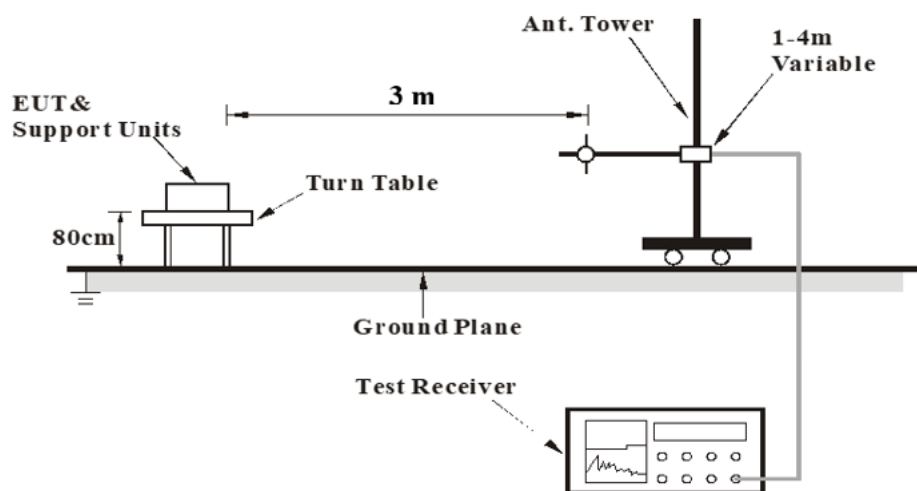
Doc No: Form-ULID-004737 (DCS:17-EM-F0876) / 6.1

Test Setup

<Frequency Range 9 kHz ~ 30 MHz>



<Frequency Range 30 MHz ~ 1 GHz >



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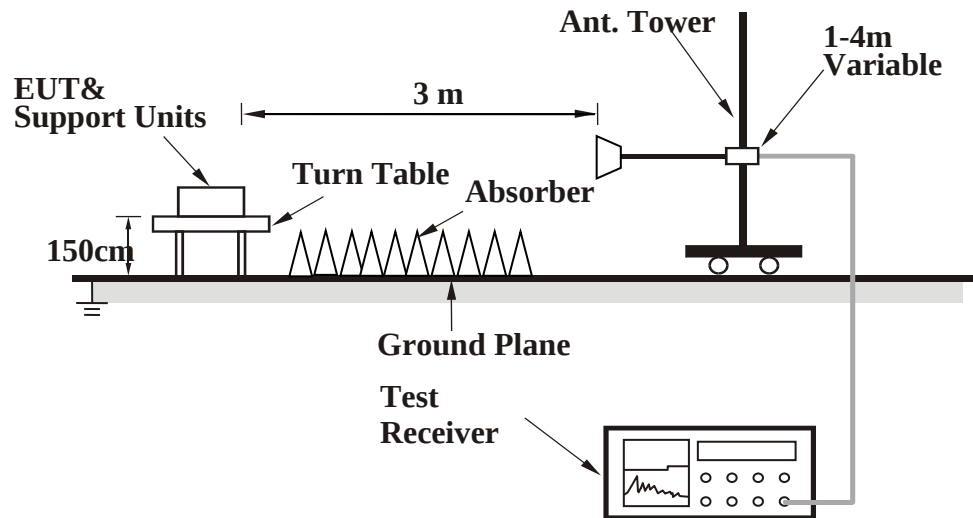
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Doc No: Form-ULID-004737 (DCS:17-EM-F0876) / 6.1

<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the Setup Configurations.

Test Data

Above 1 GHz

Mode	802.11b	Channel	1
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		2332.99	30.37	19.73	50.1	54	-3.9	AVG
		2336.79	40.35	19.72	60.07	74	-13.93	PK
	@	2412	87.19	19.36	106.55	N/A	N/A	PK
	@	2412	83.55	19.36	102.91	N/A	N/A	AVG
	*	4824	51.09	2.94	54.03	74	-19.97	PK
		4825	50.65	2.95	53.6	54	-0.4	AVG
Vertical		2315.13	40.48	19.81	60.29	74	-13.71	PK
		2318.55	30.12	19.79	49.91	54	-4.09	AVG
	@	2412	83.75	19.36	103.11	N/A	N/A	PK
	@	2412	80.04	19.36	99.4	N/A	N/A	AVG
		4824	46.88	2.94	49.82	74	-24.18	PK
		4824	46.38	2.94	49.32	54	-4.68	AVG

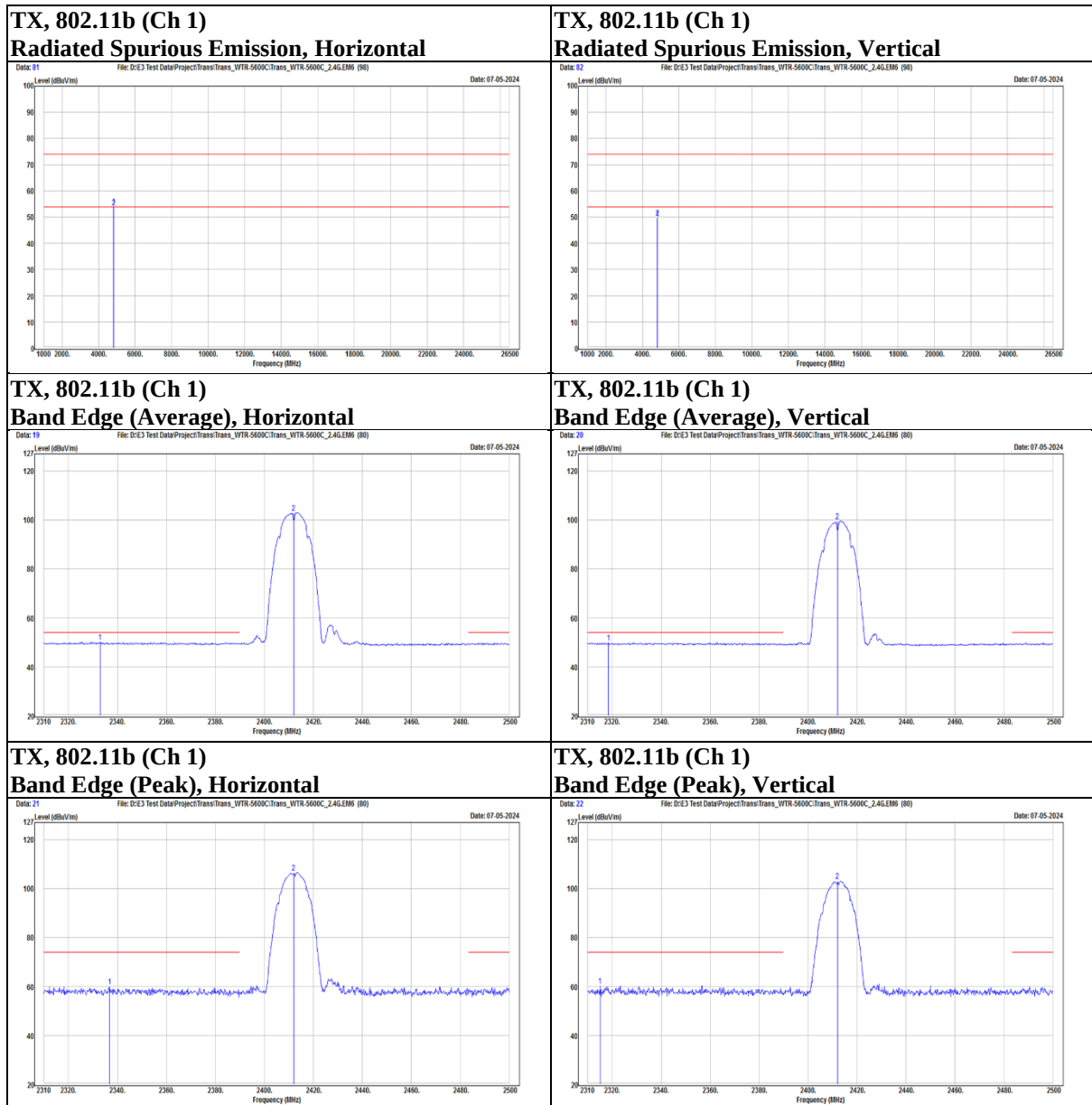
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Mode	802.11b	Channel	6
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		2318.55	40.53	19.79	60.32	74	-13.68	PK
		2372.89	30.71	19.56	50.27	54	-3.73	AVG
	@	2437	88.88	19.21	108.09	N/A	N/A	PK
	@	2437	85.23	19.21	104.44	N/A	N/A	AVG
		2487.46	40.36	19.41	59.77	74	-14.23	PK
		2498.1	30.29	19.5	49.79	54	-4.21	AVG
		4874	51.24	3.05	54.29	74	-19.71	PK
		4874	50.43	3.05	53.48	54	-0.52	AVG
	*	7311	38	11.3	49.3	74	-24.7	PK
Vertical		2332.8	30.13	19.73	49.86	54	-4.14	AVG
		2377.45	41.15	19.54	60.69	74	-13.31	PK
	@	2437	84.9	19.21	104.11	N/A	N/A	PK
	@	2437	81.21	19.21	100.42	N/A	N/A	AVG
		2488.41	40.68	19.42	60.1	74	-13.9	PK
		2497.72	30.28	19.5	49.78	54	-4.22	AVG
		4874	46.04	3.05	49.09	74	-24.91	PK
		4874	45.44	3.05	48.49	54	-5.51	AVG
	*	7311	35.64	11.3	46.94	74	-27.06	PK

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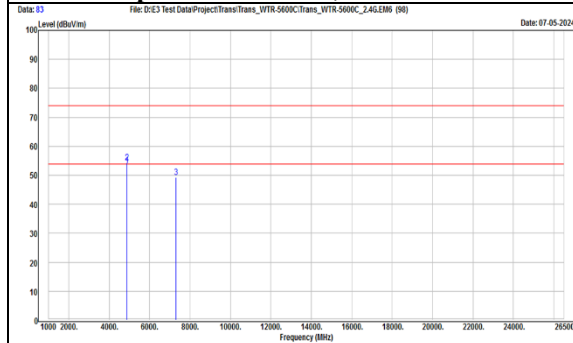
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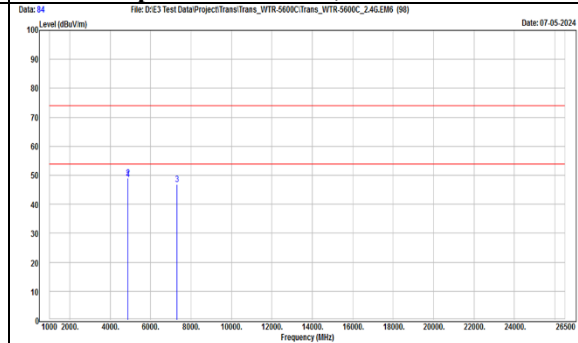
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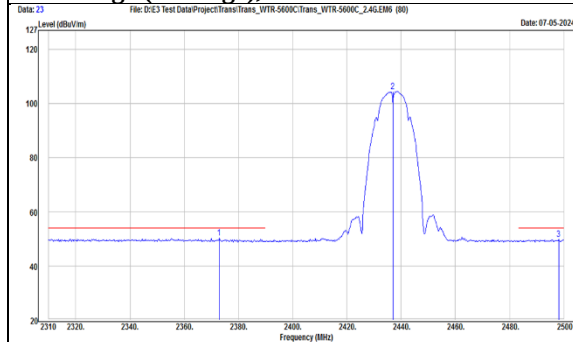
TX, 802.11b (Ch 6)
Radiated Spurious Emission, Horizontal



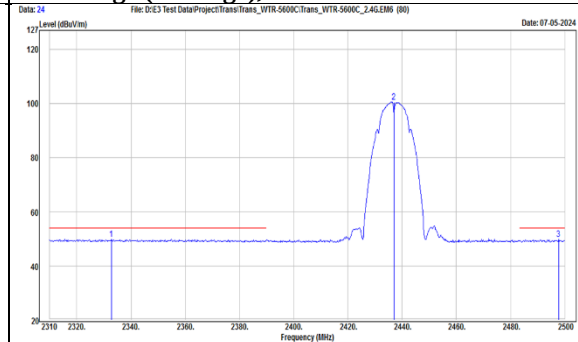
TX, 802.11b (Ch 6)
Radiated Spurious Emission, Vertical



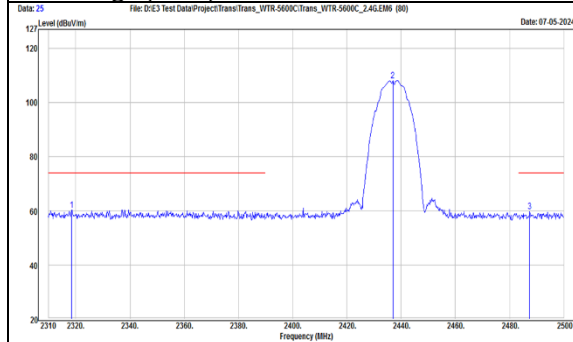
TX, 802.11b (Ch 6)
Band Edge (Average), Horizontal



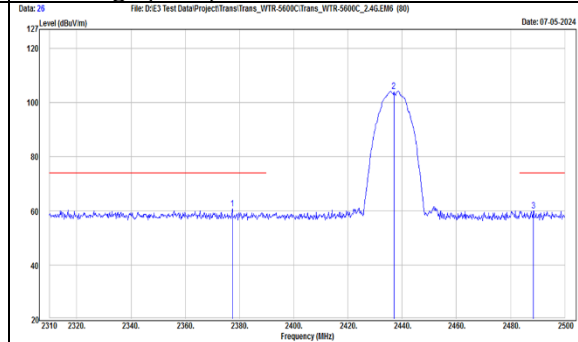
TX, 802.11b (Ch 6)
Band Edge (Average), Vertical



TX, 802.11b (Ch 6)
Band Edge (Peak), Horizontal



TX, 802.11b (Ch 6)
Band Edge (Peak), Vertical



Mode	802.11b	Channel	11
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal	@	2462	90.15	19.22	109.37	N/A	N/A	PK
	@	2462	86.62	19.22	105.84	N/A	N/A	AVG
		2483.66	34.3	19.38	53.68	54	-0.32	AVG
		2487.65	40.46	19.42	59.88	74	-14.12	PK
		4924	51.19	3.11	54.3	74	-19.7	PK
		4924	50.66	3.11	53.77	54	-0.23	AVG
	*	7386	41.21	11.19	52.4	74	-21.6	PK
Vertical	@	2462	84.73	19.22	103.95	N/A	N/A	PK
	@	2462	81.12	19.22	100.34	N/A	N/A	AVG
		2483.66	30.95	19.38	50.33	54	-3.67	AVG
		2488.6	40.2	19.42	59.62	74	-14.38	PK
		4924	47.45	3.11	50.56	74	-23.44	PK
		4924	46.92	3.11	50.03	54	-3.97	AVG
	*	7386	38.07	11.19	49.26	74	-24.74	PK

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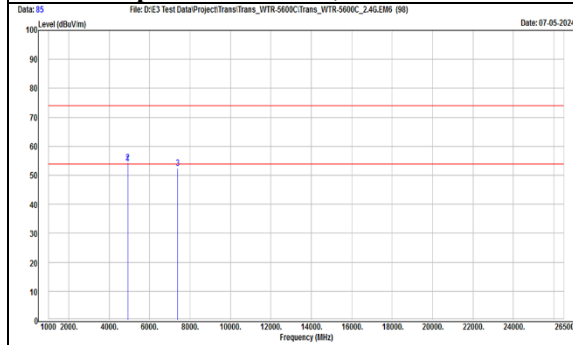
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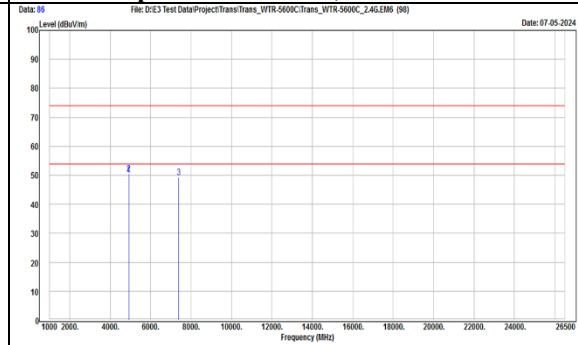
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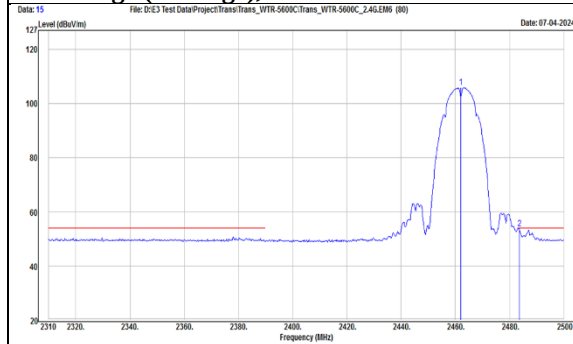
TX, 802.11b (Ch 11)
Radiated Spurious Emission, Horizontal



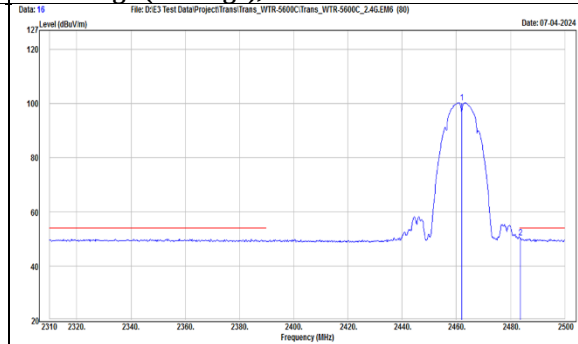
TX, 802.11b (Ch 11)
Radiated Spurious Emission, Vertical



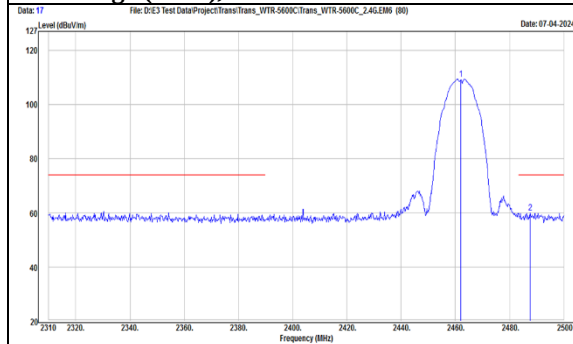
TX, 802.11b (Ch 11)
Band Edge (Average), Horizontal



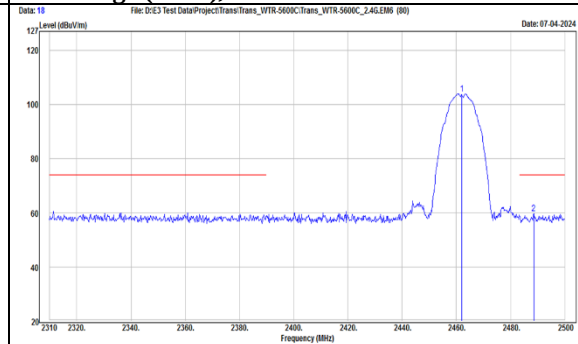
TX, 802.11b (Ch 11)
Band Edge (Average), Vertical



TX, 802.11b (Ch 11)
Band Edge (Peak), Horizontal



TX, 802.11b (Ch 11)
Band Edge (Peak), Vertical



Mode	802.11g	Channel	1
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		2313.23	40.86	19.81	60.67	74	-13.33	PK
		2389.99	34.13	19.49	53.62	54	-0.38	AVG
	@	2412	89.27	19.36	108.63	N/A	N/A	PK
	@	2412	80.87	19.36	100.23	N/A	N/A	AVG
	*	4824	48	2.94	50.94	74	-23.06	PK
Vertical		2389.61	31.03	19.49	50.52	54	-3.48	AVG
		2389.8	44.08	19.49	63.57	74	-10.43	PK
	@	2412	85.72	19.36	105.08	N/A	N/A	PK
	@	2412	77	19.36	96.36	N/A	N/A	AVG
	*	4824	46.59	2.94	49.53	74	-24.47	PK

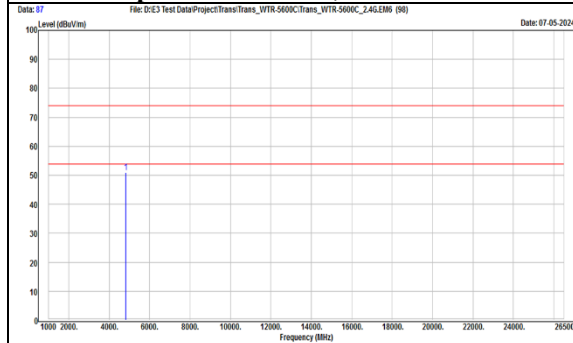
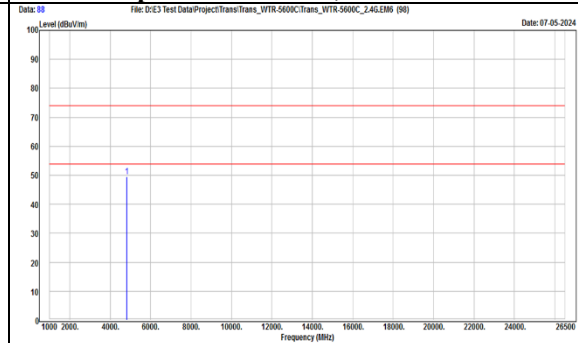
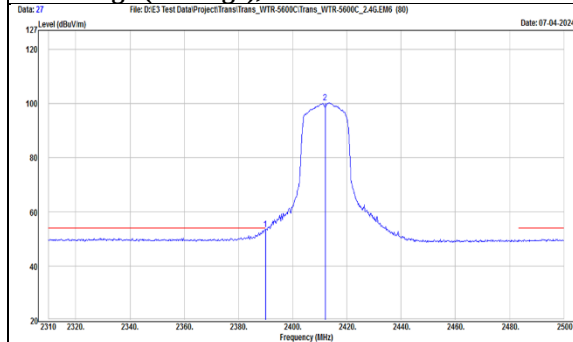
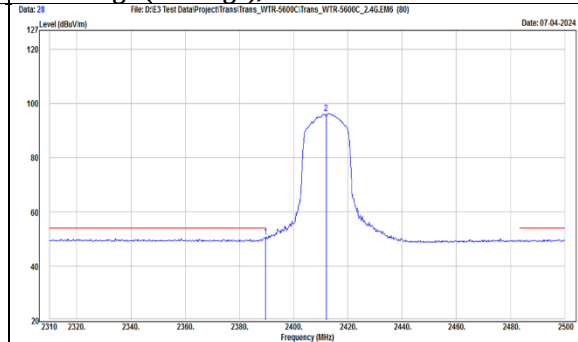
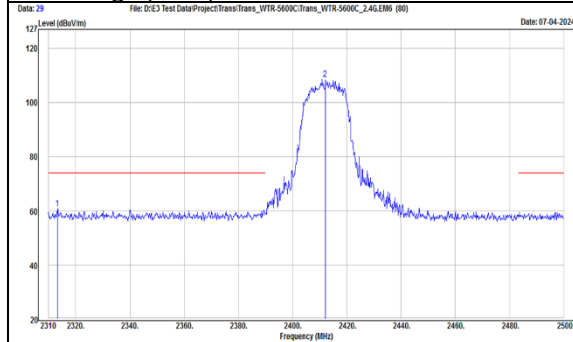
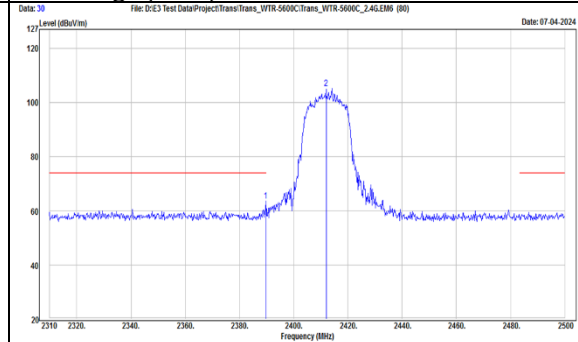
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TX, 802.11g (Ch 1)
Radiated Spurious Emission, Horizontal

TX, 802.11g (Ch 1)
Radiated Spurious Emission, Vertical

TX, 802.11g (Ch 1)
Band Edge (Average), Horizontal

TX, 802.11g (Ch 1)
Band Edge (Average), Vertical

TX, 802.11g (Ch 1)
Band Edge (Peak), Horizontal

TX, 802.11g (Ch 1)
Band Edge (Peak), Vertical


Mode	802.11g	Channel	6
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		2386.76	41.47	19.5	60.97	74	-13.03	PK
		2389.42	34.31	19.49	53.8	54	-0.2	AVG
	@	2437	95.43	19.21	114.64	N/A	N/A	PK
	@	2437	87.65	19.21	106.86	N/A	N/A	AVG
		2483.85	33.36	19.38	52.74	54	-1.26	AVG
		2489.55	42.14	19.43	61.57	74	-12.43	PK
		4874	54.96	3.05	58.01	74	-15.99	PK
		4874	47.9	3.05	50.95	54	-3.05	AVG
		7311	46.43	11.3	57.73	74	-16.27	PK
		7311	39.79	11.3	51.09	54	-2.91	AVG
Vertical		2353.7	40.26	19.64	59.9	74	-14.1	PK
		2388.09	30.75	19.49	50.24	54	-3.76	AVG
	@	2437	90.83	19.21	110.04	N/A	N/A	PK
	@	2437	82.89	19.21	102.1	N/A	N/A	AVG
		2485.18	30.76	19.39	50.15	54	-3.85	AVG
		2494.3	41.4	19.47	60.87	74	-13.13	PK
		4874	50.96	3.05	54.01	74	-19.99	PK
		4874	43.86	3.05	46.91	54	-7.09	AVG
	*	4874	43.94	3.05	46.99	54	-7.01	AVG
	*	7311	41.42	11.3	52.72	74	-21.28	PK

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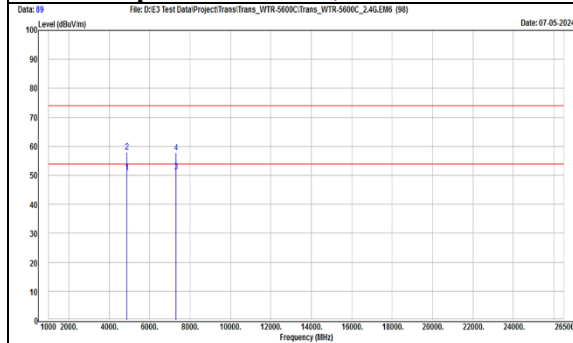
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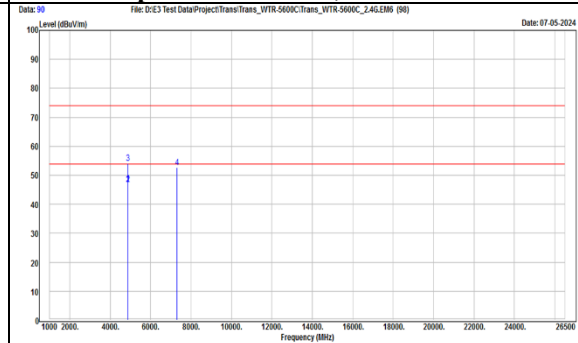
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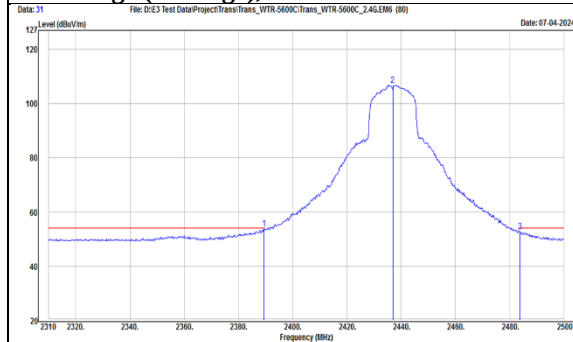
TX, 802.11g (Ch 6)
Radiated Spurious Emission, Horizontal



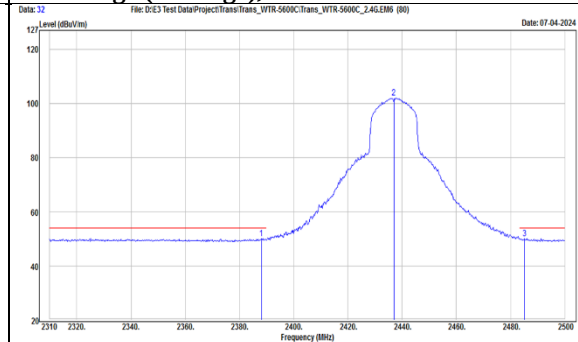
TX, 802.11g (Ch 6)
Radiated Spurious Emission, Vertical



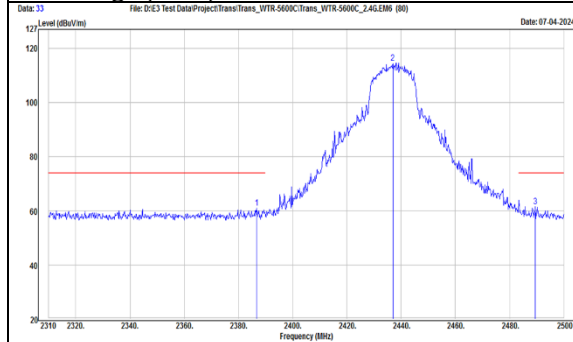
TX, 802.11g (Ch 6)
Band Edge (Average), Horizontal



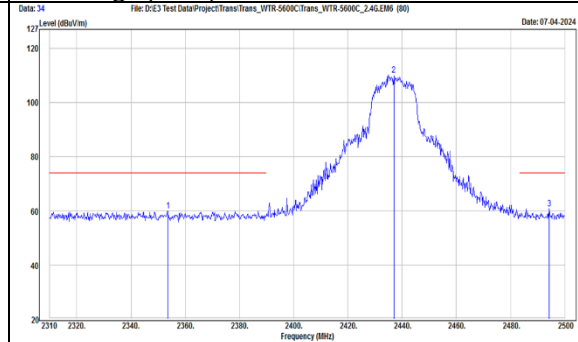
TX, 802.11g (Ch 6)
Band Edge (Average), Vertical



TX, 802.11g (Ch 6)
Band Edge (Peak), Horizontal



TX, 802.11g (Ch 6)
Band Edge (Peak), Vertical



Mode	802.11g	Channel	11
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal	@	2462	89.31	19.22	108.53	N/A	N/A	PK
	@	2462	80.82	19.22	100.04	N/A	N/A	AVG
		2483.85	43.65	19.38	63.03	74	-10.97	PK
		2483.85	34.29	19.38	53.67	54	-0.33	AVG
	*	4924	45.66	3.11	48.77	74	-25.23	PK
	*	7386	37.89	11.19	49.08	74	-24.92	PK
Vertical	@	2462	83.36	19.22	102.58	N/A	N/A	PK
	@	2462	75.77	19.22	94.99	N/A	N/A	AVG
		2483.85	31.49	19.38	50.87	54	-3.13	AVG
		2485.94	41.64	19.4	61.04	74	-12.96	PK
	*	4924	40.41	3.11	43.52	74	-30.48	PK
	*	7386	38.08	11.19	49.27	74	-24.73	PK

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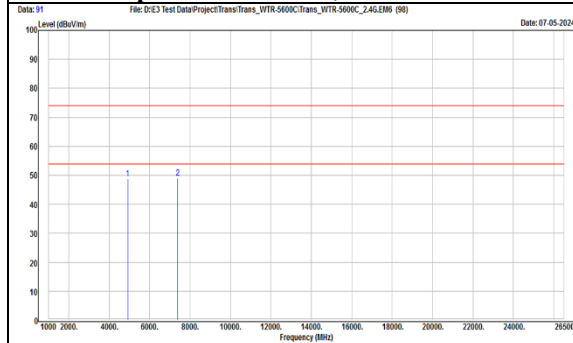
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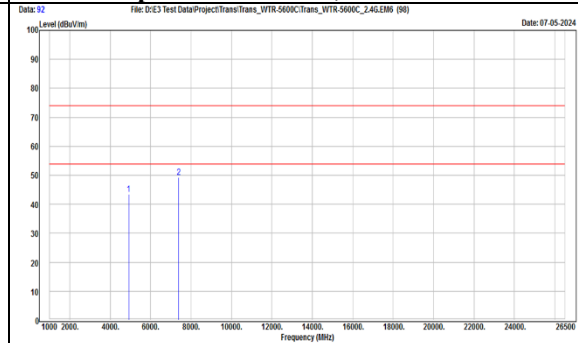
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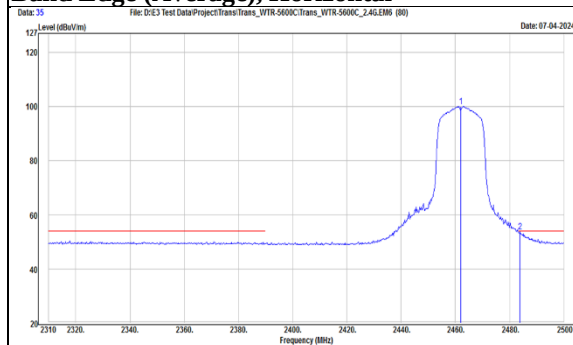
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Radiated Spurious Emission, Horizontal



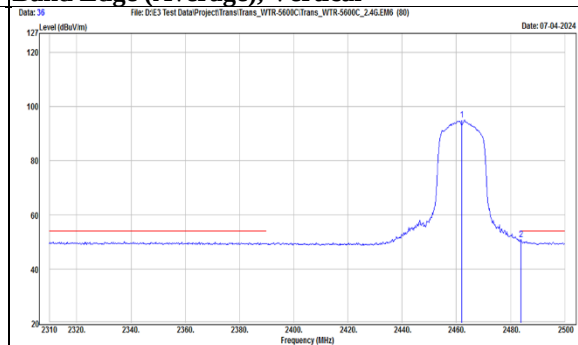
TX, 802.11g (Ch 11)
Radiated Spurious Emission, Vertical



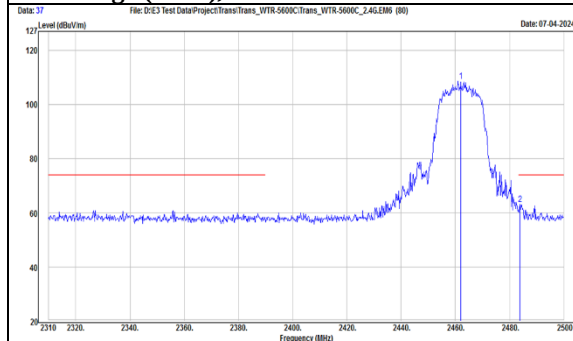
TX, 802.11g (Ch 11)
Band Edge (Average), Horizontal



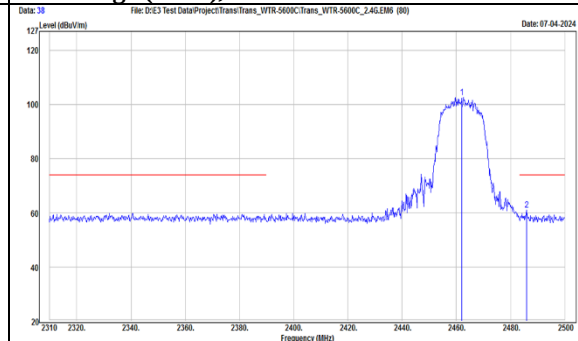
TX, 802.11g (Ch 11)
Band Edge (Average), Vertical



TX, 802.11g (Ch 11)
Band Edge (Peak), Horizontal



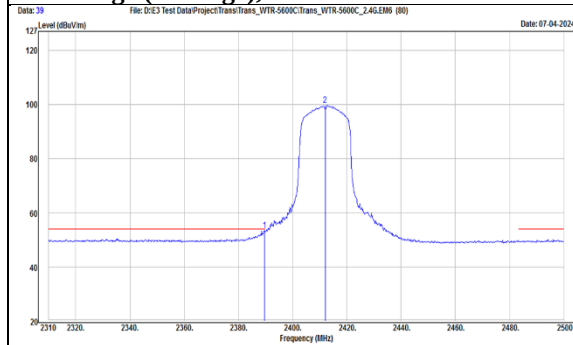
TX, 802.11g (Ch 11)
Band Edge (Peak), Vertical



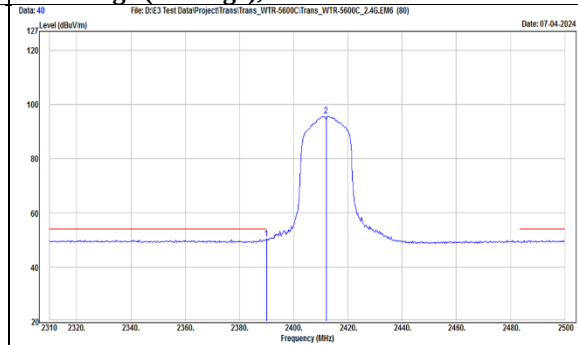
Mode	802.11n(HT20)	Channel	1
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		2386.38	42.17	19.5	61.67	74	-12.33	PK
		2389.61	33.96	19.49	53.45	54	-0.55	AVG
	@	2412	88.13	19.36	107.49	N/A	N/A	PK
	@	2412	80.35	19.36	99.71	N/A	N/A	AVG
Vertical		2381.06	41.6	19.52	61.12	74	-12.88	PK
		2389.99	30.85	19.49	50.34	54	-3.66	AVG
	@	2412	84.01	19.36	103.37	N/A	N/A	PK
	@	2412	76.56	19.36	95.92	N/A	N/A	AVG

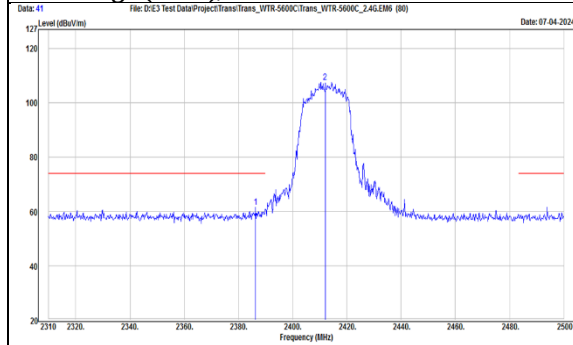
TX, 802.11n(HT20) (Ch 1)
Band Edge (Average), Horizontal



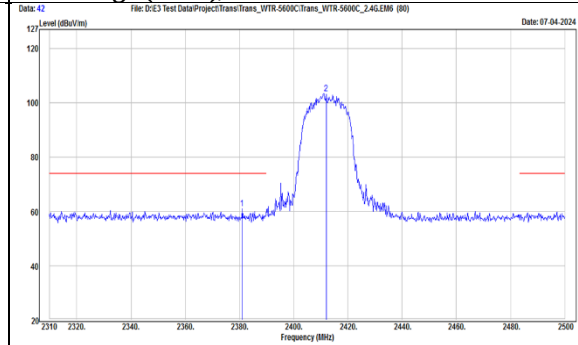
TX, 802.11n(HT20) (Ch 1)
Band Edge (Average), Vertical



TX, 802.11n(HT20) (Ch 1)
Band Edge (Peak), Horizontal



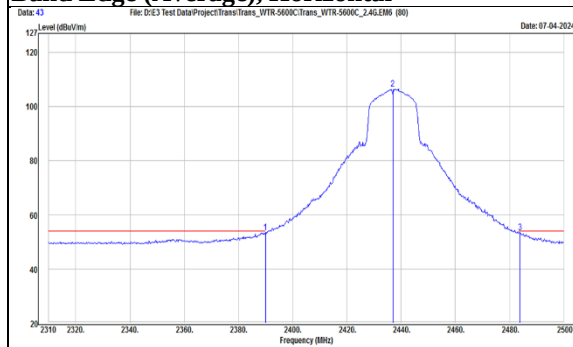
TX, 802.11n(HT20) (Ch 1)
Band Edge (Peak), Vertical



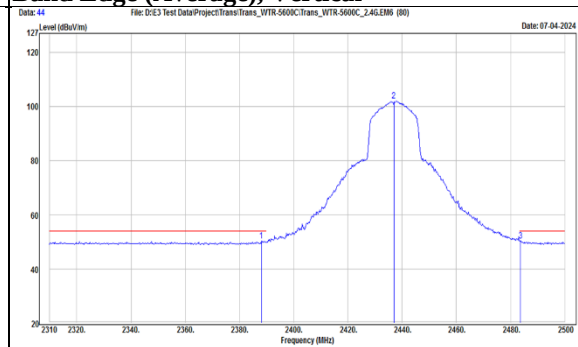
Mode	802.11n(HT20)	Channel	6
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		2387.14	41.59	19.5	61.09	74	-12.91	PK
		2389.99	34.08	19.49	53.57	54	-0.43	AVG
	@	2437	94.88	19.21	114.09	N/A	N/A	PK
	@	2437	87.22	19.21	106.43	N/A	N/A	AVG
		2483.85	34.05	19.38	53.43	54	-0.57	AVG
		2485.75	44.11	19.39	63.5	74	-10.5	PK
Vertical		2357.12	40.79	19.63	60.42	74	-13.58	PK
		2388.09	30.97	19.49	50.46	54	-3.54	AVG
	@	2437	89.53	19.21	108.74	N/A	N/A	PK
	@	2437	82.83	19.21	102.04	N/A	N/A	AVG
		2483.66	31.11	19.38	50.49	54	-3.51	AVG
		2488.98	41.28	19.42	60.7	74	-13.3	PK

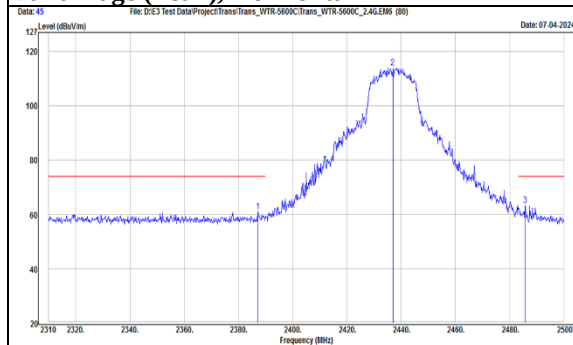
TX, 802.11n(HT20) (Ch 6)
Band Edge (Average), Horizontal



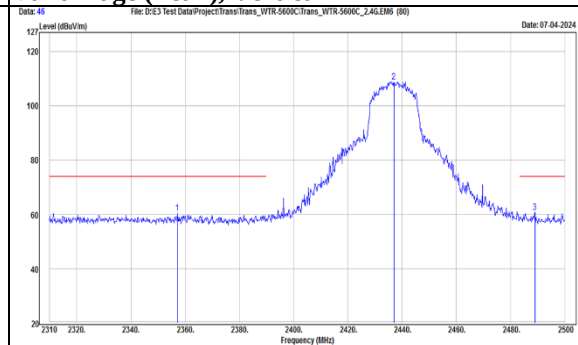
TX, 802.11n(HT20) (Ch 6)
Band Edge (Average), Vertical



TX, 802.11n(HT20) (Ch 6)
Band Edge (Peak), Horizontal



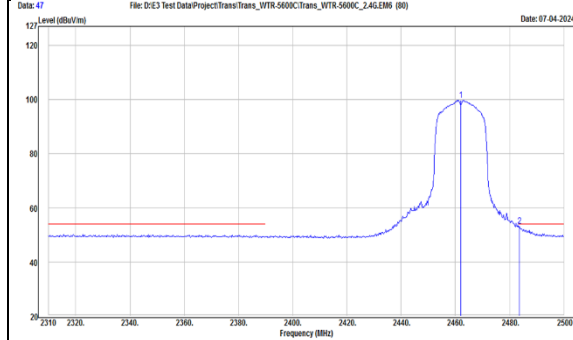
TX, 802.11n(HT20) (Ch 6)
Band Edge (Peak), Vertical



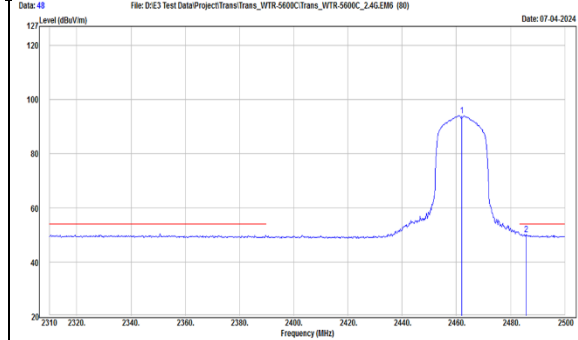
Mode	802.11n(HT20)	Channel	11
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal	@	2462	88.15	19.22	107.37	N/A	N/A	PK
	@	2462	80.5	19.22	99.72	N/A	N/A	AVG
		2483.66	33.88	19.38	53.26	54	-0.74	AVG
		2487.84	44.87	19.42	64.29	74	-9.71	PK
Vertical	@	2462	83.75	19.22	102.97	N/A	N/A	PK
	@	2462	74.87	19.22	94.09	N/A	N/A	AVG
		2485.18	39.96	19.39	59.35	74	-14.65	PK
		2485.75	30.77	19.39	50.16	54	-3.84	AVG

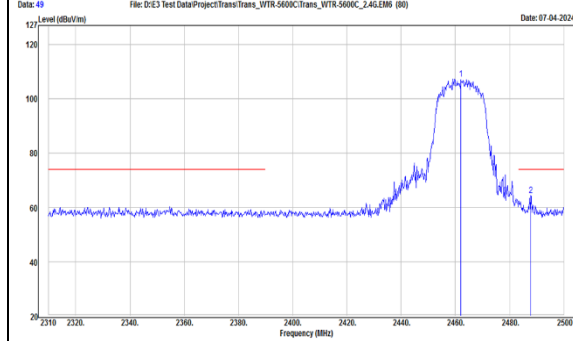
TX, 802.11n(HT20) (Ch 11)
Band Edge (Average), Horizontal



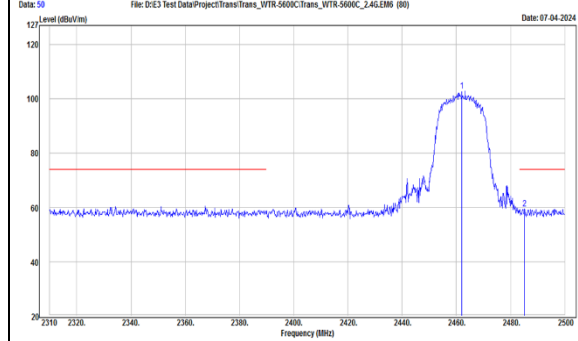
TX, 802.11n(HT20) (Ch 11)
Band Edge (Average), Vertical



TX, 802.11n(HT20) (Ch 11)
Band Edge (Peak), Horizontal



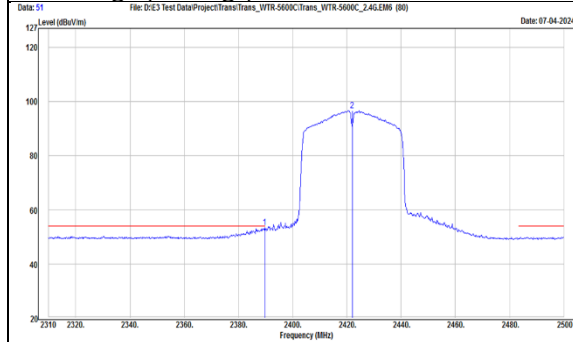
TX, 802.11n(HT20) (Ch 11)
Band Edge (Peak), Vertical



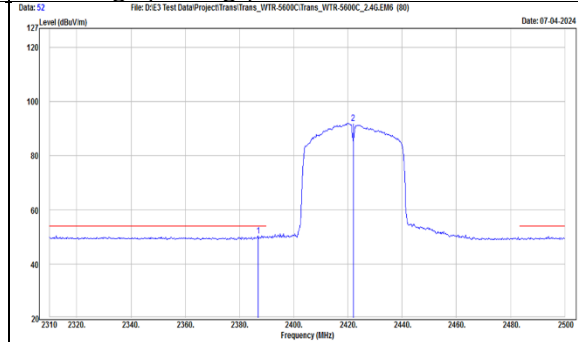
Mode	802.11n(HT40)	Channel	3
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		2387.9	47.94	19.49	67.43	74	-6.57	PK
		2389.8	33.97	19.49	53.46	54	-0.54	AVG
	@	2422	85.43	19.3	104.73	N/A	N/A	PK
	@	2422	77.4	19.3	96.7	N/A	N/A	AVG
Vertical		2386.95	30.99	19.5	50.49	54	-3.51	AVG
		2389.99	43.67	19.49	63.16	74	-10.84	PK
	@	2422	81.05	19.3	100.35	N/A	N/A	PK
	@	2422	72.64	19.3	91.94	N/A	N/A	AVG

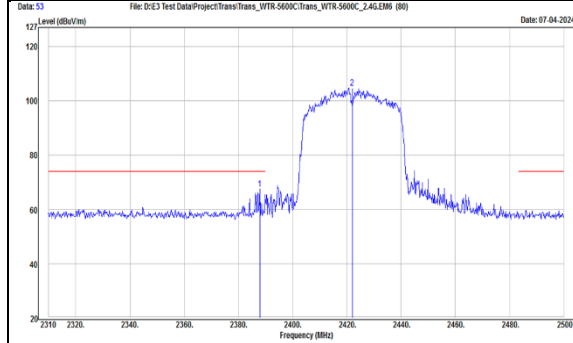
TX, 802.11n(HT40) (Ch 3)
Band Edge (Average), Horizontal



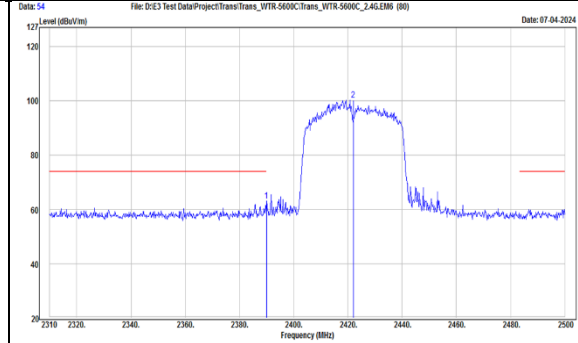
TX, 802.11n(HT40) (Ch 3)
Band Edge (Average), Vertical



TX, 802.11n(HT40) (Ch 3)
Band Edge (Peak), Horizontal



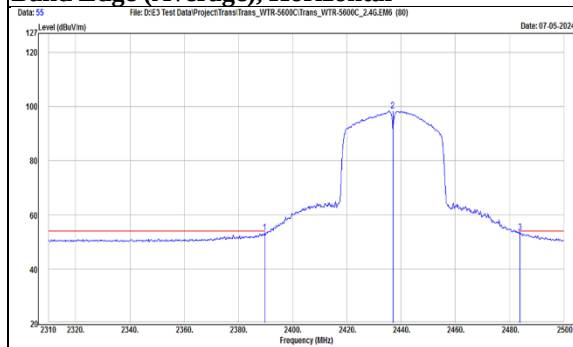
TX, 802.11n(HT40) (Ch 3)
Band Edge (Peak), Vertical



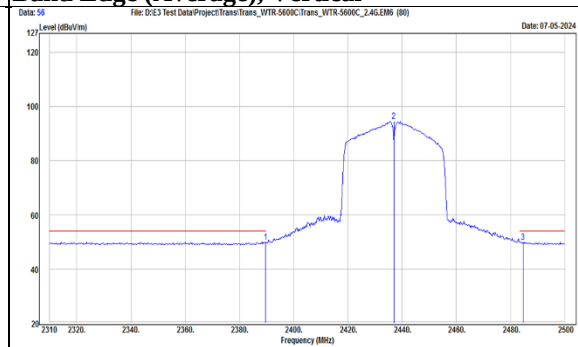
Mode	802.11n(HT40)	Channel	6
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		2389.23	41.68	19.49	61.17	74	-12.83	PK
		2389.8	33.94	19.49	53.43	54	-0.57	AVG
	@	2437	87.92	19.21	107.13	N/A	N/A	PK
	@	2437	79.15	19.21	98.36	N/A	N/A	AVG
		2483.85	34.18	19.38	53.56	54	-0.44	AVG
		2484.99	42.09	19.39	61.48	74	-12.52	PK
Vertical		2332.42	41.07	19.74	60.81	74	-13.19	PK
		2389.61	30.48	19.49	49.97	54	-4.03	AVG
	@	2437	82.27	19.21	101.48	N/A	N/A	PK
	@	2437	75.43	19.21	94.64	N/A	N/A	AVG
		2483.66	43.1	19.38	62.48	74	-11.52	PK
		2484.61	30.53	19.39	49.92	54	-4.08	AVG

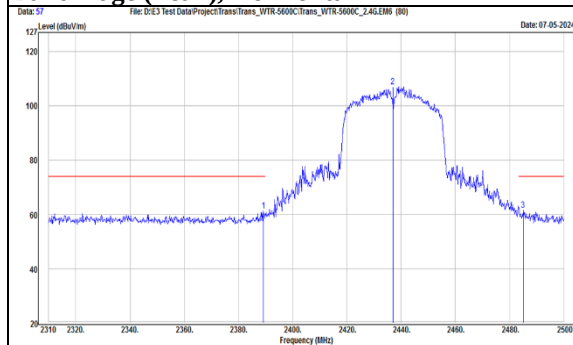
TX, 802.11n(HT40) (Ch 6)
Band Edge (Average), Horizontal



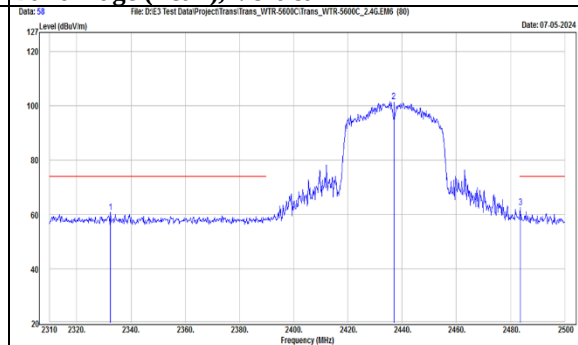
TX, 802.11n(HT40) (Ch 6)
Band Edge (Average), Vertical



TX, 802.11n(HT40) (Ch 6)
Band Edge (Peak), Horizontal



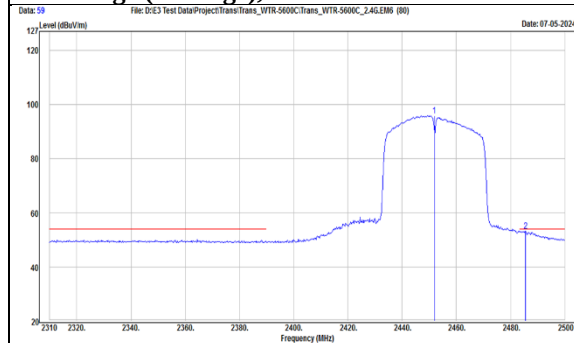
TX, 802.11n(HT40) (Ch 6)
Band Edge (Peak), Vertical



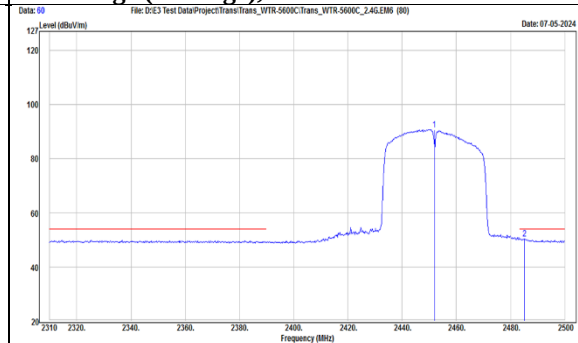
Mode	802.11n(HT40)	Channel	9
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal	@	2452	85.01	19.14	104.15	N/A	N/A	PK
	@	2452	76.75	19.14	95.89	N/A	N/A	AVG
		2485.56	33.9	19.39	53.29	54	-0.71	AVG
		2498.67	43.73	19.5	63.23	74	-10.77	PK
Vertical	@	2452	80.1	19.14	99.24	N/A	N/A	PK
	@	2452	71.62	19.14	90.76	N/A	N/A	AVG
		2484.42	41.67	19.39	61.06	74	-12.94	PK
		2485.18	30.99	19.39	50.38	54	-3.62	AVG

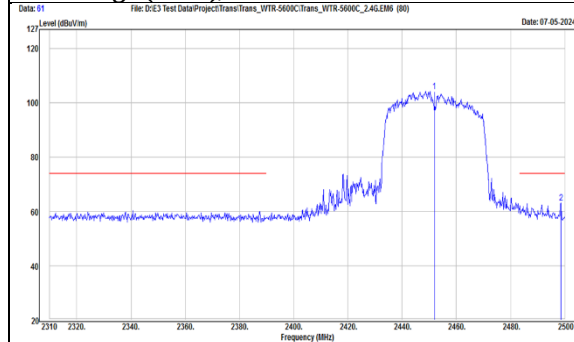
TX, 802.11n(HT40) (Ch 9)
Band Edge (Average), Horizontal



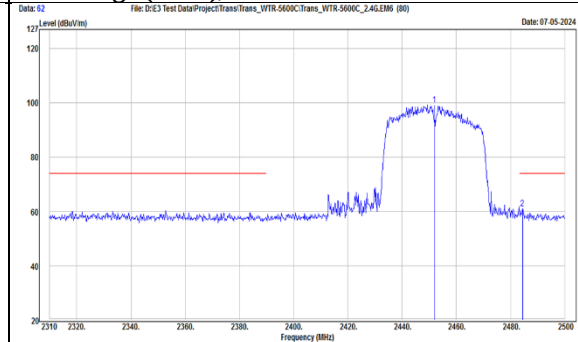
TX, 802.11n(HT40) (Ch 9)
Band Edge (Average), Vertical



TX, 802.11n(HT40) (Ch 9)
Band Edge (Peak), Horizontal



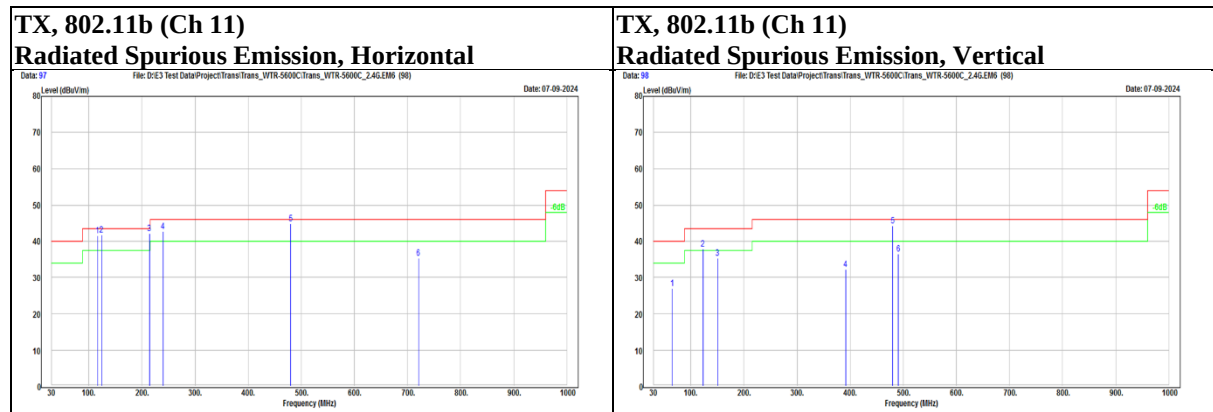
TX, 802.11n(HT40) (Ch 9)
Band Edge (Peak), Vertical



Below 1 GHz

Mode	802.11b	Channel	11
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Polarization	Notation	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
Horizontal		116.33	55.82	-14.24	41.58	43.5	-1.92	PK
		124.09	55.54	-13.85	41.69	43.5	-1.81	PK
		214.3	56.57	-14.39	42.18	43.5	-1.32	PK
		239.52	55.34	-12.61	42.73	46	-3.27	PK
		480.08	50.15	-5.25	44.9	46	-1.1	PK
		720.64	35.55	-0.27	35.28	46	-10.72	PK
Vertical		64.92	39.48	-12.54	26.94	40	-13.06	PK
		123.12	51.58	-13.78	37.8	43.5	-5.7	PK
		150.28	47.02	-11.6	35.42	43.5	-8.08	PK
		391.81	39.89	-7.61	32.28	46	-13.72	PK
		480.08	49.61	-5.25	44.36	46	-1.64	PK
		490.75	41.52	-5.08	36.44	46	-9.56	PK



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Doc No: Form-ULID-004737 (DCS:17-EM-F0876) / 6.1

9 kHz ~ 30 MHz Data:

For 9 kHz to 30 MHz radiated emission have performed all modes of operation were investigated. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

No non-compliance noted:

KDB 414788 D01 OATS and Chamber Correlation Justification

- Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

- OATs and chamber correlation testing had been performed and chamber measured test results is the worst case test result.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

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9.6. AC Power Line Conducted Emission

Requirements

Frequency (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.
2. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported, the other emission levels were low against the limit.
3. Test data of Result value (dB μ V) = Reading value (dB μ V) + Correction Factor (dB).
4. Test data of Margin(dB) = Result value (dB μ V) - Limit value (dB μ V).
5. Test data of Correction Factor (dB) = Insertion loss(dB) + Cable loss(dB).

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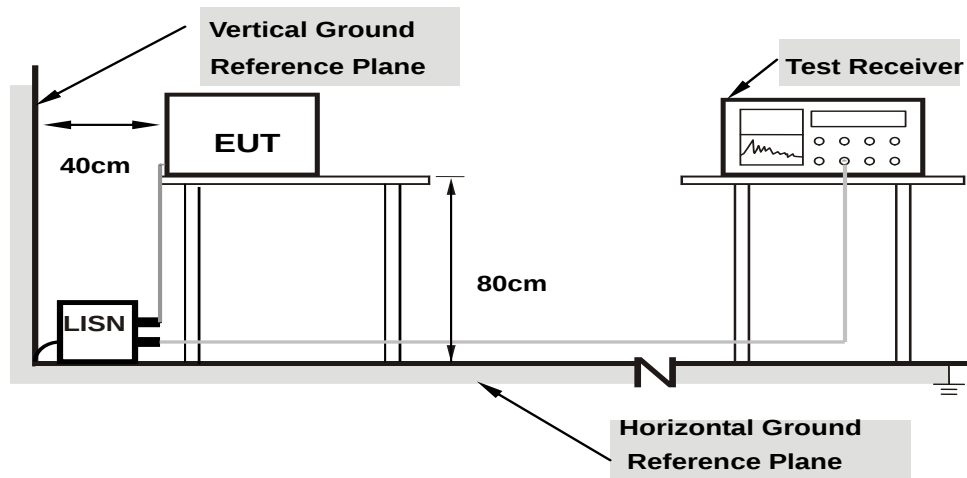
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Doc No: Form-ULID-004737 (DCS:17-EM-F0876) / 6.1

Test Setup

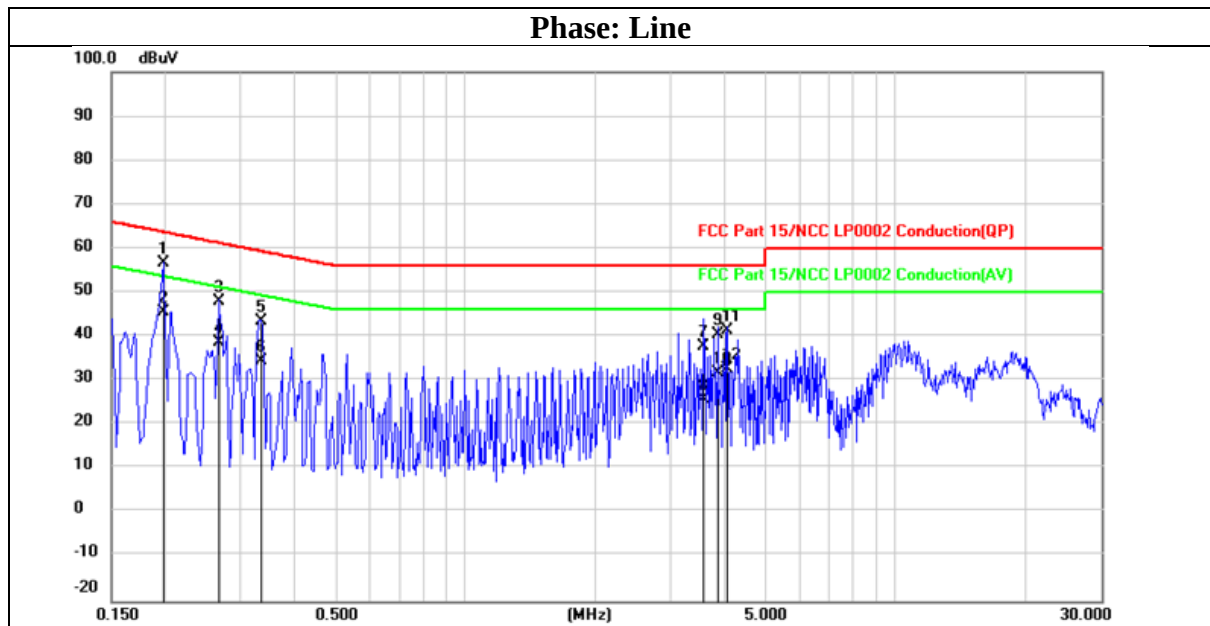


Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the Setup Configurations.

Test Data

Mode	G_TX2437	Channel	6
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1980	46.61	9.95	56.56	63.69	-7.13	QP
2	0.1980	35.54	9.95	45.49	53.69	-8.20	AVG
3	0.2660	38.12	9.95	48.07	61.24	-13.17	QP
4	0.2660	28.63	9.95	38.58	51.24	-12.66	AVG
5	0.3339	33.38	9.94	43.32	59.35	-16.03	QP
6	0.3339	24.51	9.94	34.45	49.35	-14.90	AVG
7	3.5820	27.84	10.06	37.90	56.00	-18.10	QP
8	3.5820	15.74	10.06	25.80	46.00	-20.20	AVG
9	3.8500	30.40	10.08	40.48	56.00	-15.52	QP
10	3.8500	21.79	10.08	31.87	46.00	-14.13	AVG
11	4.0500	31.22	10.08	41.30	56.00	-14.70	QP
12	4.0500	22.66	10.08	32.74	46.00	-13.26	AVG

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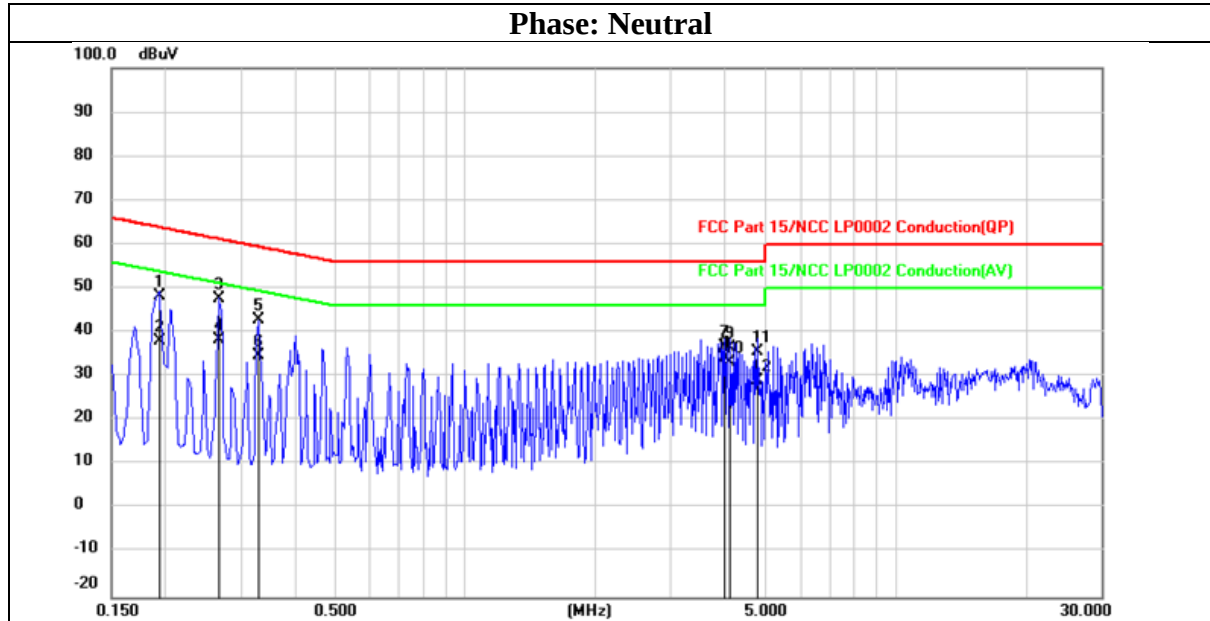
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Mode	G_TX2437	Channel	6
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No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1940	38.29	9.94	48.23	63.86	-15.63	QP
2	0.1940	28.04	9.94	37.98	53.86	-15.88	AVG
3	0.2660	37.64	9.94	47.58	61.24	-13.66	QP
4	0.2660	28.47	9.94	38.41	51.24	-12.83	AVG
5	0.3300	32.93	9.94	42.87	59.45	-16.58	QP
6	0.3300	24.96	9.94	34.90	49.45	-14.55	AVG
7	3.9900	26.73	10.08	36.81	56.00	-19.19	QP
8	3.9900	24.12	10.08	34.20	46.00	-11.80	AVG
9	4.1180	26.49	10.08	36.57	56.00	-19.43	QP
10	4.1180	23.10	10.08	33.18	46.00	-12.82	AVG
11	4.7860	25.51	10.11	35.62	56.00	-20.38	QP
12	4.7860	19.05	10.11	29.16	46.00	-16.84	AVG

END OF REPORT

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